



Chesterfield County Annual Stormwater Management And Monitoring Report 2012



Detailed watershed investigation - Marine Spring Branch, August 2012

**Chesterfield County
Department of Environmental Engineering
Water Quality Section
April 2013**

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Executive Summary

The following document presents the data and information generated for Chesterfield County's VPDES permit report during the calendar year 2012.

Structural Controls - Best Management Practices

In 2012, the county certified a total of 25 Best Management Practice and Stormwater Management structures. Collectively, these structures have been designed to remove a total of 104.93 pounds of phosphorus from 221.48 acres. A total of 291 existing BMPs and SWMs received routine maintenance by county staff in 2012. Commercial and institutional property owners maintained another 142 private structures. Additionally, drainage maintenance staff performed 249 visual inspections of BMPs and SWMs during rain events in 2012 to monitor performance and function of the structures. During 2012, county staff performed maintenance activities on 38.25 miles of storm sewer infrastructure.

Source Controls - Public Information and Engagement Program

In 2012, the Water Quality Section received over 800 resident calls/e-mails. Chesterfield County Department of Environmental Engineering partnered with the Chesterfield County Libraries and offered three rain garden workshops in the fall of 2012. These were attended by forty residents and resulted in the construction of three rain gardens at public libraries. A total of seven rain barrel workshops were held in 2012 resulting in 194 rain barrels being constructed and put into use in Chesterfield County homes.

In 2012, the Richmond Regional TMDL Implementation workgroup recommended a pet waste outreach campaign to educate the public about the importance of disposing pet waste to reduce bacterial pollution in runoff. In 2012, the Richmond Regional Pet Waste Outreach Committee printed 2000 posters and 2000 stickers that displayed the "Stop the Drop" logo. The outreach campaign will officially launch in early 2103. The "Plant More Plants" media campaign brought to the Richmond Metro Region by the Virginia Department of Conservation and Recreation (DCR) continued in 2012. Chesterfield County Environmental Engineering contributed \$5000.00 to VADCR to support media purchasing for the campaign.

The Water Quality Section Environmental Outreach Coordinator actively participated in the Middle James River Roundtable and served on the Roundtable's Executive Committee. In March 2012, the Roundtable held its annual meeting at Virginia Commonwealth University with 91 people in attendance.

Chesterfield County's Department of Environmental Engineering and Friends of Chesterfield's Riverfront launched the Riparian Stewardship Program in 2010 to encourage county residents to cherish and protect the riparian buffers in their land. To date, 9,154 Chesterfield residents have received outreach materials that detail the benefits of riparian buffers and introduce the Riparian Stewardship Fund.

Source Controls - Education Programs

Chesterfield County Environmental Engineering has created programs targeted at students and educators in the Chesterfield County Public School System, county staff, local universities, businesses, civic organizations and volunteer organizations. These programs are designed to raise awareness of water quality issues, stormwater management and pollution prevention.

In June 2012 the Water Quality Section Environmental Outreach Coordinator was invited to present at the VCU Summer Teacher Institute. The session covered water conservation, stormwater pollution prevention and rain barrels. Seventeen teachers from school districts across Virginia attended the program and created rain barrels for use at schools. Twenty-one rain barrels were created at this session.

In March 2012 Environmental Engineering and Utilities Staff demonstrated dye tracing techniques to 91 students at Bon Air Elementary School to raise awareness about stormwater pollution. In October and November 2012, Environmental Engineering and Parks and Recreation staff collaborated to host four field trips for 97 sixth grade students from Robious Middle School. The program, held at the Dutch Gap Conservation Area, engaged students in water quality monitoring and kayaking.

The Water Quality Section Environmental Outreach Coordinator served as the aquatics coach for the Chesterfield area Envirothon, an annual environmental science competition for high school students. In March of 2012, twenty-one students from three area high schools participated in the event.

The Stormwater Pollution Prevention class offered through Chesterfield University was lengthened to two hours to include a field based portion. Water Quality Section staff provided instruction to 39 county employees in 2012. Additionally, Chesterfield County's Department of General Services, Fleet Management Division provided training on its Spill Prevention Control and Countermeasures Plan (SPCC) to 29 designated employees during 2012.

Source Controls - Volunteer Activities

A comprehensive set of volunteer programs are in effect in Chesterfield County providing multiple opportunities for residents to "make a difference" in their communities. The Chesterfield WaterTrends Program was continued with success in 2012. Thirty-one stream and river sites and two lakes in Chesterfield County were investigated with the results integrated into the DEQ non-agency database. Forty-five residents provided 548.3 hours of monitoring in the program in 2012. Volunteer groups installed a total of 523 storm drain placards in 2012. Chesterfield County staff installed an additional 95 as part of a Supplemental Environmental Project. A total of 618 storm drain placards were installed throughout the county in 2012.

General Services - Environmental Division Education and Outreach Programs

Chesterfield County Department of General Services – Environmental Division implemented and/or participated in three pollution prevention education and outreach programs in 2012

targeted toward the reduction of trash, debris and litter. These programs relate and contribute to the county's stormwater program by reducing the amount of floatable materials and debris conveyed to the stormwater system by rain events or deposition. The programs were a "Fool for Art/Environmental Fair" in April where staff addressed the general public on various pollution prevention strategies and a Tire Amnesty Day and Regency Lake Cleanup event held in May.

Source Controls – County Pollution Prevention Projects

Chesterfield County initiates and completes various short and long term pollution prevention projects on county property that reduce impacts on the environment. Four projects were continued and/or completed in 2012 that either directly or indirectly related to the county's stormwater system. These projects were implemented at a total cost of \$11,860.

Plans and Regulatory Updates and Improvements

The county continued to implement a number of plans and regulations designed to protect, improve and preserve water quality of water bodies within and downstream of its boundaries. In 2012, there were public hearings held to adopt a countywide comprehensive plan. There was one regulatory amendment to ordinances pertaining to water quality; however there were several process improvements for the implementation of programs.

In April of 2009, the Chesterfield County Board of Supervisors authorized starting work on the county's comprehensive plan, including retaining private consultants to assist in overall plan development. The comprehensive plan is a process that will help solidify the county's vision for the future, enabling local government officials and residents to anticipate and deal constructively with changes occurring within their community. During 2011, efforts to adopt previous draft plans met with public resistance, therefore in 2012, following extensive public participation, the Comprehensive Plan was produced by county staff, recommended by the Planning Commission, and adopted by the Board of Supervisors in October 2012. In the following years, the Plan will be implemented through ordinances, policies, education and other tools. Details of the plan as well as the progress can be found on the county website.

In 2012, the county continued its implementation of the Chesapeake Bay Act and made improvements to the review process for requests for encroachment within the Resource Protection Area (RPA). During the calendar year of 2012, 28 proposals for encroachment within the RPA were requested of the county. Of these, four requests required a formal hearing before Board of Supervisors for approval and the remaining 24 requests met the requirements for administrative approval. During 2012, 57 Resource Protection Area Designations were conducted yielding approximately three miles of new perennial streams. In 2012, fifteen alleged RPA violation investigations were conducted. Seven required enforcement actions as a result of improper disturbance or clearing of the vegetation within the RPA.

Storm Sewer System Maintenance and Improvements

During 2012, Drainage Section staff performed maintenance activities on 38.25 miles of storm sewer infrastructure. Chesterfield County Department of Environmental Engineering completed

three major drainage improvement projects in 2012 to alleviate flooding and standing water in neighborhoods. These projects improved stormwater drainage for 25 homes and were completed at a total cost of \$505,300.

Illicit Discharge, Storm Sewer and Water Quality Investigations

Department of Environmental Engineering - Water Quality Section staff conducted a total of 142 water quality investigations in 2012, including 102 illicit discharge investigations resulting in 62 Notices of Violation. The illicit discharge investigations were divided into six categories: mopwater/washwater, organics, chemical, hydrocarbons, vegetation/sediment, and miscellaneous. The two most common violations (mopwater/washwater, vegetation/sediment) accounted for 72 of the 102 illicit discharge investigations. During 2012, Water Quality Section staff conducted screenings of 34 outfalls and seven upstream structures. Of the 41 structures, eight had dry weather flows or standing water at the outfall pipe, thereby initiating additional laboratory testing. Four had potential illicit discharges and will be revisited in early-2013. Thirty-two (32) additional outfall screenings performed at the county airport complex by a private consultant indicated no incidents of noncompliance or non-stormwater discharges observed.

In 2012, Chesterfield Health District responded to 65 septic complaints and issued 160 system repair permits in the county. Additionally, 200 septic system and pump inspections were performed in 2012. As a result of these complaint responses, investigations and onsite inspections, Chesterfield Health District issued a total of 43 Notices of Alleged Violation during 2012. Additionally, the Health District received documentation relating to 5,459 septic tank pump outs and 307 Alternative Onsite Sewage System (AOSS) inspections conducted in the county during 2012.

The Department of Utilities - Wastewater Collections Division maintained approximately 1,970 miles of sanitary sewer lines and responded to seven reportable public sanitary sewer incidences during 2012. In all of the incidents the lines were cleaned/repared and added to a preventive maintenance "trouble spot" list.

The Chesterfield County Fire Marshal's office reported seven occurrences in 2012 where Fire Department personnel were dispatched to address incidences involving either the direct release of product to the county stormwater system or where there was a high probability a release would occur if not immediately remediated. In all instances, HAZMAT staff secured the site and contained the product to insure no further discharges occurred. HAZMAT personnel or commercial remediation contractors performed subsequent cleanup operations.

Detailed Watershed Assessments

A detailed watershed investigation was launched for a small watershed, Marine Spring Branch, after a WaterTrends volunteer found high *E. coli* bacteria concentrations in a sample. The investigation used illicit discharge detection techniques to bracket the watershed in order to isolate either a suspected septic system or sanitary sewer in need of repair. However, the high *E. coli* bacteria results were not duplicated. Instead, investigators found low to moderate *E. coli*

bacteria concentrations, and increases in fluoride and conductivity as water travelled downstream. These results indicated other issues in the watershed such as the excess use of fertilizers and over-watering during lawn irrigation.

Watershed level assessments were conducted within three drainage basins in 2012; four stream sites draining directly to the Appomattox River, six stream segments draining directly to the James River and at five reaches within the Michaux Creek watershed. Physical, chemical, biological, and habitat data were collected and analyzed with the results integrated into a water quality index score. The majority of these assessments indicated either poor (n=2) or fair (n=8) water quality conditions.

Management and Disposal of Used Oil and Toxic Materials

During 2012, approximately 68,235 pounds of used motor oil from Fleet Management Facilities were recycled and used as fuel at five county clean burn furnaces. Additionally, 5,263 pounds of used antifreeze and 25,050 pounds of oil solids (crushed filters and absorbents) were collected and recycled. At Chesterfield County Fleet Management Facilities, no reportable oil spills as defined by the EPA in the Clean Water Act and Oil Pollution Act occurred during 2012.

Facility Inspections

Thirty-nine commercial and industrial facilities were inspected during routine MS4 compliance evaluations or as responses to illicit discharge findings. An additional thirteen “advisory” inspections of industrial facilities were conducted by the stormwater inspector who provided recommendations on stormwater issues. The stormwater inspector also routinely performed informal inspections of commercial and industrial facilities and found many of the incidents described below in “Releases from Commercial/Industrial Facilities” as a result. Changes were made to the *Industrial and Commercial Facility Inspection Standard Operating Procedure Manual* as a result of the U.S. EPA audit.

Releases from Industrial/Commercial Facilities

Thirty-eight releases to the county’s stormwater system occurred during 2012 from industrial and commercial activities. Thirteen of these releases occurred from the improper disposal of wash water and cooking oil/grease from restaurants. Eight releases occurred from automotive repair or sales facilities, and eight releases were from mobile services such as garbage trucks, cement trucks, mobile automotive detailers and fertilizer applicators. The remaining nine were for diverse violations such as spills, trash, cleaning tools and equipment, and an equipment malfunction on clay tennis courts. In all instances compliance with Chesterfield County’s stormwater ordinance was achieved.

Erosion and Sediment Control

In 2012, Environmental Engineering issued 92 Land Disturbance Permits for 483.85 acres and 25,077 erosion and sediment control inspections were conducted. There were 18,785 erosion and sediment control inspections conducted for single-family dwellings, 101 inspections for the

acceptance of new secondary roads, 6,034 inspections for development sites and subdivisions and 157 inspections resulting from residents' complaints. Eighty two of the site and subdivision inspections resulted in the issuance of Notices to Comply. There were three Notices of Violations issued during the 2012 calendar year. Failure to comply with these notices resulted in five stop work orders issued. The Chesterfield County Department of Environmental Engineering ESC program continues to be compliant with the Soil and Water Conservation Board in 2012.

§122.26 (d) (2) (iv) (A)
**“A DESCRIPTION OF STRUCTURAL AND SOURCE CONTROL MEASURES TO
REDUCE POLLUTANTS FROM RUNOFF FROM COMMERCIAL AND
RESIDENTIAL AREAS THAT ARE DISCHARGED FROM THE MUNICIPAL STORM
SEWER SYSTEM”**

(1) "A program to utilize structural and source control measures to reduce pollutants that are discharged through the municipal, separate storm sewer system in storm water runoff from commercial and residential areas, including a schedule for implementing the controls."

Structural Controls

Chesterfield County has required structural controls in the form of Best Management Practice (BMP) facilities since 1991 to meet Chesapeake Bay Preservation Ordinance requirements. Such facilities are constructed as a means of reducing the amount of pollutants generated by new development projects. Additionally, Stormwater Management structures (SWM) installed on sites that do not fall under the requirements of the Chesapeake Bay Preservation Ordinance have the potential to remove pollutants, although such efficiencies and ability are not typically measured. The construction and proper installation of BMPs and SWMs are verified in the field by a licensed engineer or surveyor and are subsequently certified by the county. Once a BMP or SWM is certified, it is entered into the county's database for tracking, inspection and maintenance. To date there are 545 certified structures present in Chesterfield County.

Table 1. BMP/SWM facilities certified in Chesterfield County, 2012. The “n” designation following four of the project names reflect the number of individual BMPs of that specific type certified onsite during 2012.

<u>Project Name</u>	<u>Address</u>	<u>Type</u>	<u>HUC</u>	<u>Watershed</u>	<u>Receiving Waterbody</u>	<u>Acres Treated</u>	<u>P Removed (lbs/yr)</u>
2101 Bermuda Hundred Road Parking Expansion	2101 Bermuda Hundred	Detention	JA45 Ashton/Johnson Creek	Shand Creek	19.32	4.25	
Belfair Townhouses Section 3,4 Stage 1	3926 Belrun Road	Wet Marshy	JL02 Falling Creek	Pocoshock Creek	27.49	10.09	
Belfair Townhouses Section 3,4 Stage 2	3926 Belrun Road	Wet Marshy	JL02 Falling Creek	Pocoshock Creek	22.38	7.07	
Bon Secours/Watkins Centre Medical Office Park	601 Watkins Centre Parkway	Retention	JA41 Upper Swift Creek	Tomahawk Creek	17.70	25.69	
Chester Congregation of Jehovahs Witnesses	13301 Harrowgate Road	Detention	JA45 Ashton/Johnson Creek	Ashton Creek	1.54	1.23	
Family Worship Center & Alpha/Omega Church of God	7202 Belmont Road	Detention	JL02 Falling Creek	Licking Creek	14.49	1.77	
Goodwill Industries Hull Street Road (n=4)	14740 Hull Street Road	Filterra	JA41 Upper Swift Creek	Swift Creek Reservoir	1.29	1.79	
Magnolia Green Amenity Center	11701 Championship	Retention	JA41 Upper Swift Creek	Blackman Creek	31.63	12.81	
Panda Express	13340 Rittenhouse Drive	Bio-Retention	JA42 Middle Swift Creek	Swift Creek	0.10	0.09	
Panda Express (n=3)	13340 Rittenhouse Drive	Filterra	JA42 Middle Swift Creek	Swift Creek	0.72	0.91	
Rachels Way	9965 Reymet Court	Retention	JL03 Kingsland/Proctors	Kingsland Creek	12.00	4.66	
Robious Middle School Addition	2801 Robious Crossing Drive	Detention	JM8 Powhite Creek	Powhite Creek	3.32	1.31	
Ruffin Mill Industrial Park Overall BMP Basins D,E	801 Port Walthall Drive	Retention	JA45 Ashton/Johnson Creek	Appomattox River	31.10	24.40	
Saint Francis Medical Center North Parking Lot	13710 St Francis Boulevard	Bio-Retention	JL02 Falling Creek	Little Tomahawk	1.90	1.57	
Saint Francis Medical Center North Parking Lot	13710 St Francis Boulevard	Filterra	JL02 Falling Creek	Little Tomahawk	0.50	0.72	
Unity Christ Church of Bon Air Additions (n=2)	923 Buford Road	Filterra	JM8 Powhite Creek	Powhite Creek	0.65	0.87	
Walgreens Iron Bridge Road	10230 Iron Bridge Road	Detention	JA42 Middle Swift Creek	Swift Creek	34.80	4.98	
Walthall Dealership (n=2)	2300 Walthall Center Drive	Filterra	JA45 Ashton/Johnson Creek	Ashton Creek	0.55	0.72	

In 2012, the county certified a total of 25 BMP and SWM structures. Collectively, the structures have been designed to remove a total of 104.93 pounds of phosphorus (P) from 221.48 acres. Details concerning these newly added structures are presented in Table 1.

The Chesapeake Bay Preservation Ordinance requires that BMPs and SWMs be properly inspected and maintained. In Chesterfield County, two maintenance schedules are in effect.

Commercial structures not in the upper Swift Creek watershed are inspected the first year after certification and every three years thereafter. The inspection and maintenance is the responsibility of the owner of the facility. Schedules are tracked through a database that determines when necessary maintenance must take place. The database generates letters notifying facility owners of the need to perform an inspection.

Subdivision structures and commercial property facilities in the Upper Swift Creek watershed are the responsibility of the county's Department of Environmental Engineering for both inspection and maintenance. The inspection and maintenance are normally performed on a yearly schedule by county staff.

A total of 291 existing BMPs and SWMs received routine maintenance by county staff in 2012. Commercial and institutional property owners maintained another 142 structures. Additionally, drainage maintenance staff performed 249 visual inspections of BMPs and SWMs during rain events in 2012 to monitor performance and function of the structures (risers draining, inflow and outflow conveyances clear, *etc*).

Source Controls - Public Information and Engagement Program

The public information and engagement program plays an important role in protecting water quality in Chesterfield County. The program is divided into three categories: general outreach, education programs and volunteer activities. General outreach occurs on a daily basis as staff interacts with the public. All staff members use the water quality publications and website as tools. In 2012, The Water Quality Section received over 800 resident calls/e-mails. Other general outreach occurs by participating in events such as community fairs, regional social marketing campaigns, and a variety of program offerings. The education program includes student engagement, educator training and county personnel training. Finally, volunteer programs exist for residents who show an interest in the environment and water quality and want to actively participate in a program.

General Outreach Programs

The general outreach programs are designed for all Chesterfield County residents. They are designed to raise awareness of water quality issues and prepare residents to be stewards of Chesterfield County waterways and the Chesapeake Bay.

Rain Garden Workshops

In 2012 Chesterfield County Department of Environmental Engineering partnered with the Chesterfield County Libraries to offer a new educational program for residents. The Rain Garden workshop series equips county residents with skills and resources to create residential scale rain gardens at home. Three workshops were held in the fall of 2012 and were attended by forty residents. At the workshops, residents learned about rain garden design and built a public rain garden at each location. Public rain gardens with interpretive signs were installed at the Enon, Clover Hill and Midlothian Libraries. In addition a *Rain Garden Installation and Design* booklet was published. Over 2000 copies of the booklet were distributed in 2012. The program was supported by a grant from the Chesapeake Bay Restoration Fund.

Rain Barrel Workshops

Water Quality Section staff and community partners collaborate to offer rain barrel workshops for county residents. Partners included: the Chesterfield County Cooperative Extension office, and the James River Soil and Water Conservation District and the Chesterfield County Public Libraries. Chesterfield Master Gardeners were trained as volunteers for the workshops and assisted program staff with implementation. Workshops were held in April, May and June of 2012. A total of seven workshops were held and 194 rain barrels were constructed and put into use in Chesterfield County homes and surrounding areas.

Stop the Drop Campaign / P.U.P Club

The Water Quality Section Environmental Outreach Coordinator served as the chairperson of the regional committee spearheading this program. This outreach program is a collaborative effort of: Chesterfield County, Henrico County, the City of Richmond and other local environmental groups and non-profit organizations. The campaign stemmed from the James River Bacteria TMDL adopted in 2010. The regional TMDL Implementation workgroup recommended a pet waste outreach campaign to educate the public about the importance of disposing of pet waste to reduce bacterial pollution in runoff. In 2012, the Richmond Regional Pet Waste Outreach Committee printed 2000 posters and 2000 stickers that displayed the “Stop the Drop” logo. The outreach campaign will launch in February 2013 with a Facebook Page and region-wide display of the posters and stickers at pet-related businesses and destinations.

Plant More Plants Campaign / Chesapeake Club

The “Plant More Plants / Chesapeake Club” media campaign brought to the Richmond Metropolitan Region by the Virginia Department of Conservation and Recreation (VADCR) in 2007 was continued in 2012. The outreach material for this campaign presents a message about proper lawn care and fertilizer use and is designed to affect behavior change by appealing to consumers’ love of seafood and the Chesapeake Bay lifestyle.

The lead agency (VADCR) received a grant from the National Fish and Wildlife Foundation to support the Chesapeake Club television advertisements and print materials. The Water Quality Section Environmental Outreach Coordinator served as a member of the steering committee that guided the Chesapeake Club program in 2012.

The “Plant More Plants” campaign encourages homeowners to plant native species of trees and shrubs in their yards to filter and absorb runoff. The 2012 campaign included television and internet advertising and in-store promotions with retail partners. The campaign ran in Richmond, Norfolk and Washington D.C. In 2012 Chesterfield County Environmental Engineering contributed \$5000.00 to VADCR to support media purchasing for the campaign.

LID (Low Impact Design) Program

The Chesterfield County Department of Environmental Engineering encourages engineers and developers to use Low Impact Design (LID) for the reduction of pollutants, volume and velocities of stormwater to adjacent streams and rivers within the Chesapeake Bay Watershed. LID practices preserve and recreate the natural landscape and hydrologic conditions of a site by minimizing impervious surfaces and allowing for infiltration. Unlike conventional storm water management techniques that focus on removing storm water quickly from a site, LID practices

are designed to allow infiltration, reduce velocities and filter pollutants. Examples of LID practices include green roofs, rain gardens, rain barrels, permeable pavers and bioretention areas. The Department of Environmental Engineering website has a comprehensive list of LID resources for engineers and builders. The development community is encouraged to use these resources.

The Middle James Roundtable

The Middle James Roundtable is a consortium of stakeholders that brings people together to improve the health and water quality of the James River watershed. Participants include residents, businesses, civic organizations and government. The Water Quality Section Environmental Outreach Coordinator served on the Roundtable Executive Committee and Steering Committee in 2012.

In March 2012, the roundtable held its annual meeting at Virginia Commonwealth University. Discussion topics included: the Chesapeake Bay TMDL, Virginia stormwater regulations and on-the-ground practices that homeowners and stormwater professionals will need to undertake to achieve pollution reduction goals. Ninety-one people attended this meeting.

The Roundtable was awarded a 2010 Chesapeake Bay Restoration Fund grant to support the design and printing of restaurant coasters and place mats about water quality stewardship. Roundtable partners including Chesterfield County have the ability to customize the material with their own messages and logos. The Water Quality Section Environmental Outreach Coordinator served as chairperson of the roundtable education committee leading the project. The project resulted in the production of 50,000 restaurant coasters and 62,500 educational placemats. To date, approximately 20,000 coasters and 35,000 placemats have been distributed to Roundtable partners statewide including schools and community groups in Chesterfield County.

Chesterfield County Riparian Stewardship Program

In 2008, Chesterfield County Environmental Engineering was awarded a Chesapeake Bay Small Watershed Grant to establish a Riparian Stewardship Program. This program aims to motivate riparian landowners to maintain healthy buffer areas adjacent to water bodies on their property. Components of this grant included developing targeted social marketing outreach materials for riparian landowners and holding riparian landowner workshops.

Chesterfield County's Department of Environmental Engineering and Friends of Chesterfield's Riverfront launched the Riparian Stewardship Program in 2010. To date, 9,154 Chesterfield residents have received outreach materials that detail the benefits of riparian buffers and introduce the Riparian Stewardship Fund.

The Chesterfield County Water Quality Section Website

The Department of Environmental Engineering – Water Quality Section's website located at <http://www.chesterfield.gov/content2.aspx?id=2851> also serves as a valuable tool for general education & outreach. All county publications mentioned in this report are available online in a PDF format, as well as general water quality information, technical reports and staff contacts.

Education Programs

Chesterfield County Department of Environmental Engineering has created programs targeted at students and educators in the Chesterfield County Public School System. The programs are focused on educator training and student engagement. Additionally the Water Quality Section staff is responsible for training county personnel in stormwater management techniques and pollution prevention. The Water Quality Section staff also offers programs and training to local universities, businesses, civic organizations and volunteer organizations. These programs are designed to raise awareness of water quality issues in pupils and staff and prepare them to be stewards of Chesterfield County waterways and the Chesapeake Bay.

Educator Training

The Water Quality Section staff plays an active role with the Chesterfield County Public School System. It works with the Science Lead Instructors in developing curriculum, the grants administrator in securing funding and individually with teachers. The Enviroscope, a non-point source runoff training aid, is available to all teachers free of charge from the Water Quality Section. A limited number of water quality monitoring kits are also available and provided to teachers free of charge.

Virginia Commonwealth University Teacher Institute

In June 2012, the Water Quality Section Environmental Outreach Coordinator was invited to present at the VCU Summer Teacher Institute. The session covered water conservation, stormwater pollution prevention, and rain barrels. Seventeen teachers from school districts across Virginia attended the program and created rain barrels for use at school. Twenty-one rain barrels were created at this session.

Student Engagement Programs

Bon Air Elementary School stormwater program

In March of 2012, the Environmental Outreach Coordinator visited Bon Air Elementary School and led a dye tracing demonstration with staff from the Chesterfield County Department of Utilities so students could observe colored water entering a drop inlet and discharging to a creek through an outfall. The exercise demonstrated that the storm sewer system is connected directly to natural waterways and raised awareness about stormwater pollution. Ninety-one students attended the program.

Robious Middle School field trips

In October and November, the Departments of Environmental Engineering and Parks and Recreation collaborated to host four field trips for the sixth grade class of Robious Middle School. The program engaged students in water quality monitoring and kayaking. Ninety-seven students attended the programs held at the Dutch Gap Conservation Area.

Envirothon

The Water Quality Section Environmental Outreach Coordinator served as the aquatics coach for the Chesterfield area Envirothon, an annual environmental science competition for high school

students. In March of 2012, twenty-one students from three area high schools participated in the event.

Chesterfield University Training & County Environmental Management System Training

Chesterfield University offers courses to all Chesterfield County employees on a diverse range of topics including total quality management, workplace issues and personal leadership. Water Quality Section staff developed and delivered a course through Chesterfield University regarding storm water pollution prevention at work and at home. Chesterfield University introduced a new School of Health, Environment, Safety and Security (SHESS) in 2012. The Stormwater Pollution Prevention class became a required class for the SHESS certificate. Accordingly, the class was lengthened to two hours and now includes a field-based pollution spill demonstration.

Water Quality Section staff presented the Stormwater Pollution Prevention class in April, June, September and December of 2012. Employees attended from multiple Chesterfield County departments including Utilities, Parks and Recreation, Health, General Services, and Police. A total of 39 county employees attended the classes. Additionally, Chesterfield County's Department of General Services, Fleet Management Division provided training on its Spill Prevention Control and Countermeasures Plan (SPCC) to 29 designated employees during 2012.

Virginia High School League Leadership Conference

In April 2012, the Water Quality Section Environmental Outreach Coordinator was invited to present at the VHSL Leadership Conference for rising Juniors and Seniors. The program covered the basics of starting a water quality monitoring in schools. Nine students attended the session.

Volunteer Activities

A comprehensive set of volunteer programs are in effect in Chesterfield County providing multiple opportunities for residents to "make a difference" in their communities. Objectives of the volunteer programs are to:

- Enhance public education activities and promote stewardship
- Involve a cross-section of county residents
- Complement the monitoring requirements of the county's VPDES permit
- Provide a team of resident monitors who can identify water quality improvements or degradation in their community

Chesterfield WaterTrends – Citizen Volunteer Water Quality Monitoring

Chesterfield WaterTrends is Chesterfield County's official citizen monitoring program. WaterTrends monitors collect data on a volunteer basis to indicate a general state of water quality throughout the county. Regular measurements of water quality were made by volunteers at thirty-one stream and river stations and at two lake stations in Chesterfield County in 2012. During 2012, there were 408 individual site visits conducted by 45 volunteer monitors, representing a total of 548.3 hours of effort. Results were submitted and integrated into the VADEQ non-agency database and are presented in detail within Section 2.3 of this report.

Volunteer Storm Drain Marking

The Water Quality Section began the Storm Drain Marking Program in 2000 with a Chesapeake Bay Small Watershed Grant administered by the National Fish and Wildlife Foundation. Two thousand placards and supplies were purchased with this grant money for a pilot project. The placards include the name of the river, stream or reservoir that the area drains to as well as the anti-pollution message of “No Dumping!” and the county’s illicit discharge hotline number. Four communities and several Boy Scout Troops were involved in the initial marking program. In 2001, Chesterfield County received a second grant to purchase an additional 10,500 placards and expand the program countywide. In 2012, a total of 523 placards were installed in Chesterfield County by volunteer groups (Table 2).

Table 2. Storm drain marking program statistics 2012.

Location	Watershed	Curb Markers Installed
Bayhill Pointe Subdivision	Swift Creek	244
Bermuda Square Shopping Center.	Tributary to the James River	40
Birkdale/Springford Subdivisions	Swift Creek	187
Woodlake Community	Swift Creek Reservoir	52
Total		523

Volunteer Cleanup Efforts

The Water Quality Section actively participated in the James River Regional Cleanup, hosted by the James River Advisory Council. This event takes place the second weekend of June and attracts hundreds of participants in Chesterfield County. Multiple Chesterfield County Departments including the Cooperative Extension and Parks and Recreation participated in the event. The county offered two sites for volunteers in 2012: Dutch Gap Boat Landing, and the Falling Creek Ironworks Park. During this clean-up 221 volunteers collected 104 bags of trash and 119 bags of recyclables at the two sites.

In June 2012, Chesterfield County Department of Environmental Engineering partnered with the Chesapeake Bay Foundation and the Chesterfield Department of General Services to coordinate a volunteer cleanup of Pocoshock Creek. The efforts focused on two reaches of the creek. The first was behind the Pocono Green shopping center on Midlothian Turnpike and the other was at the south end of Sturbridge Drive. Thirty-five volunteers collected 75 bags of trash and three sofas which totaled 2350 pounds.

Department of General Services Education and Outreach Programs

Chesterfield County Department of General Services – Environmental Division implemented and/or participated in three pollution prevention education and outreach programs in 2012 targeted toward the reduction of trash, debris and litter. These programs relate to the county’s storm water program by reducing the amount of floatable materials and debris conveyed to the storm water system by rain events or deposition. The three programs were the “Fool for Art/Environmental Fair” held on April 21 and a Tire Amnesty Day and Regency Lake Cleanup events both of which were held on May 5, 2012. During the Tire Amnesty event, up to five tires were accepted at the Southern Area Convenience Center free of charge with the hope of reducing

illegal tire dumping, which often occurs along natural drainage ways in the county. All of the events focused on keeping Chesterfield County clean and green with a strong emphasis of keeping the roadways litter free. Litter and debris are commonly found in the storm water system, especially along interstate, state and county roadways.

On April 21, 2012, twenty-two employees from the Department of General Services - Fleet Management Division participated in the annual “Fool for Art” Earth Day Event at John Tyler Community College. At this event Fleet Management staff spoke to the general public about a variety of pollution prevention and energy saving programs such as alternative fuels, fuel saving tips, recycling, pollution prevention projects and the county’s clean burn furnaces. Additionally, storm water successes (crushing and recycling oil filters, proper disposal of used oil, antifreeze, and contaminated fuels and absorbents, storage of used tires) were presented to the public.

Outreach Materials

The Water Quality Section continues to use the Water Quality Watch Fact Sheet series created in 1997 as a general outreach and education vehicle to residents and businesses. These publications are republished and updated as needed and when funds become available. Other publications have been created and distributed, as the need exists, such as the *Don’t Feed the Lake* brochure. In 2012 a new booklet, *Rain Garden Installation and Design* was released. To date, over 2000 copies have been distributed. Table 3 on the following page lists Chesterfield County’s current outreach materials.

Table 3. Chesterfield County Outreach Materials 2012.

Material	Type	Lead Group	Target Group
<i>Chesterfield County Water Quality Section website: http://www.chesterfield.gov/content2.aspx?id=2851</i>	<i>Website</i>	<i>Water Quality</i>	<i>General public</i>
<i>Chesterfield County Resource Protection Area Restoration Guide</i>	<i>Booklet</i>	<i>Water Quality</i>	<i>General public</i>
<i>Chesterfield County Resource Protection Area Restoration Guide Chesterfield County Stormwater Management Program Chesapeake Bay Resource Protection Areas The Streams of Chesterfield County Homeowners Guide to Flood Plain Management Business & Industry Guide to Chesterfield County's Illicit Discharge Ordinance Household Guide to Chesterfield County's Illicit Discharge Ordinance Chesterfield County's Stormwater Drainage System</i>	<i>Fact Sheet</i>	<i>Water Quality</i>	<i>General public</i>
<i>What is this Orange Slime in my Creek? What is this Foam in my Creek? What are those Tubes in the Field?</i>	<i>Fast Enviro Facts Sheet</i>	<i>Water Quality</i>	<i>General public</i>
<i>Rain Garden Installation and Design</i>	<i>Booklet</i>	<i>Water Quality</i>	<i>General public</i>
<i>Don't Feed the Lake</i>	<i>Brochure</i>	<i>Water Quality</i>	<i>Citizens who live near lakes</i>
<i>Storm Drain Markers</i>	<i>Plastic marker adhered to storm drains</i>	<i>Water Quality</i>	<i>General public</i>
<i>Chesterfield Extension Website: http://www.chesterfield.gov/HumanServices/ExtensionServices/exthome.asp</i>	<i>Website</i>	<i>Chesterfield Extension</i>	<i>General Public</i>
<i>Six Steps to Cleaner Water (lawn & home)</i>	<i>Brochure</i>	<i>Chesterfield Extension</i>	<i>General Public</i>
<i>Home Landscape Practices to Protect Water Quality</i>	<i>Brochure</i>	<i>Chesterfield Extension</i>	<i>General Public</i>
<i>Chesterfield County – Did you Know? (Fact sheet on lawn care)</i>	<i>Fact Sheet</i>	<i>Chesterfield Extension</i>	<i>General Public</i>
<i>Lawn Care Clinics (5 clinics in addition to being online)</i>	<i>Power Point Presentation</i>	<i>Chesterfield Extension</i>	<i>Interested Public</i>
<i>Five Ways to Help the James</i>	<i>Brochure & Ads in newspapers</i>	<i>Middle James Roundtable</i>	<i>General Public</i>
<i>James River Watershed Educational Placemats/Activity Sheets</i>	<i>Placemat/Activity Sheet</i>	<i>Middle James Roundtable</i>	<i>General Public</i>

Source Controls – County Pollution Prevention Projects

Chesterfield County initiates and completes various short and long term pollution prevention projects on county property that reduce impacts on the environment. Four projects were continued or completed in 2012 that either directly or indirectly related to the county's stormwater system (Table 4). These projects were implemented at a total cost of \$11,860. The projects were initiated, administered and completed voluntarily by the county to prevent unwanted discharges to the environment.

Table 4. County pollution prevention projects related to MS4 ongoing or completed in 2012.

Pollution Prevention Project	County Department	Date Completed	Implementation Cost	Resulting Improvement
Rogers Building cooling tower water run off	Buildings and Grounds	Ongoing	Pending Funding	Reduction of cooling tower runoff to ground water & adjacent stream
Maintenance of chemical runoff from cooling towers	Buildings and Grounds	Ongoing	\$9,960.00	Eliminate the probability for environmental contamination.
Used Tire Recycling	General Services - Fleet Management	Ongoing	No Cost Incurred	Avoidance of stormwater runoff by keeping collected used tires inside the shop overnight prior to recycling.
Sealed the asphalt containment area at the airport tank farm	General Services - Airport	June 2012	\$1,900.00	Ensured positive containment at the airport tank farm during fueling operations.

(2) “A description of planning procedures including a comprehensive master plan to develop, implement and enforce controls to reduce the discharge of pollutants from the municipal separate storm sewer which receives discharges from areas of new development and significant redevelopment. Such plan shall address controls to reduce pollutants in discharges from municipal separate storm sewer after construction is complete.”

The task areas currently being implemented to conform to the above requirement include:

- Implementation of the adopted October 2012 Comprehensive Plan for Chesterfield County. The Plan is the guiding document for future growth and development decisions.
- Implementation of the County's *Water Quality Protection Plan* adopted by the County Board of Supervisors in November of 2002.
- Implementation of the Comprehensive *Upper Swift Creek Plan amendment* adopted by the County Board of Supervisors in June of 2008.

- Development and refinement of the *Watershed Management Master Plan and Maintenance Program for the Swift Creek Reservoir Watershed* adopted by the County Board of Supervisors in October of 2000.
- Update on the Stream Restoration Projects.
- Continued implementation of the County's Chesapeake Bay Preservation, Floodplain Management, Erosion & Sediment Control Ordinances and Upper Swift Creek Watershed (Exceptions or Variances).
- County facility inspections (See §122.26 (d)(2)(iv)(B)(2))
- Updates to the County's Environmental Management System Policy.

Water Quality Protection (WQP) Plan replaced in 2012 by the Comprehensive Plan for Chesterfield County

In 2012, the intent of the WQP Plan adopted by Chesterfield County Board of Supervisors in November of 2002 was incorporated into the Chapter 9 - Environment of the Comprehensive Plan for Chesterfield County. The Comprehensive Plan includes many chapters designed to address the issues and challenges that face Chesterfield County as the community continues to grow and evolve. The guidelines of each chapter are based upon the principles of these goals. Achieving these goals will ensure Chesterfield County continues to be a healthy, thriving community providing residents with a high quality of life; employers with a supportive business climate; and visitors with positive historical, cultural, recreational and shopping experiences. The goals ensure that valued environmental resources are protected and where appropriate enhanced, through fair regulatory practices and regulations while accommodating growth and development consistent with the Plan. Vital environmental resources and features are integrated into development designs for enjoyment by the community, where appropriate.

The success of this new comprehensive plan will depend heavily on providing all residents of Chesterfield County with important information, seeking their input on issues and concerns about planning in the County and involving all those interested at all levels. Though its format varies from jurisdiction to jurisdiction, the comprehensive plan is a broad effort to address a wide range of community issues and concerns, understanding the important relationships between each part.

In April of 2009, the Chesterfield County Board of Supervisors authorized starting work on the county's comprehensive plan, including retaining private consultants to assist in overall plan development. The comprehensive plan is a process that will help solidify the county's vision for the future, enabling local government officials and residents to anticipate and deal constructively with changes occurring within their communities. During 2011, efforts to adopt previous draft plans met with public resistance, therefore in 2012, following extensive public participation, the Comprehensive Plan was produced by county staff, recommended by the Planning Commission, and adopted by the Board of Supervisors in October 2012. In the following years, the Plan will be implemented through Ordinances, policies, education and other tools. Details of the plan as well as the progress can be found on the county website at: <http://www.chesterfield.gov/plan/>.

By incorporating environmental and sustainability principles, the Comprehensive Plan helps to ensure that what benefits present generations will not diminish the needs and aspirations of

future generations. As part of this process, the WQP Plan components were reviewed and modified as necessary to meet the county's current and future needs. Those sections of the WQP Plan that are still relevant were assimilated into the Comprehensive Plan. This effectively eliminated the need for a separate plan thereby replacing the Water Quality Protection Plan. In 2012, DCR staff through a series of emails provided comments which were incorporated into the draft Comprehensive Plan and in August 2012 DCR staff provided final comments which could be addressed during any future amendments.

Upper Swift Creek Plan Amendment

The Upper Swift Creek Plan Amendment, which generally guides land development within the majority of the Swift Creek Reservoir Watershed, began implementation in June 2008. As indicated in the proceeding section, this plan, as well as the other 20 area and five countywide plans were reviewed and relevant sections included in the 2012 Comprehensive Plan. The new countywide Comprehensive Plan was adopted in October 2012 during a public hearing by the County Board of Supervisors.

Watershed Management Master Plan and Maintenance Program for the Swift Creek Reservoir Watershed

Implementation of the goal and many of the recommendations of the *Upper Swift Creek Plan* will be guided by the work conducted as a result of the *Watershed Management Master Plan and Maintenance Program for the Swift Creek Reservoir Watershed* and its amendments.

In January 2006, the use of regional in-stream ponds met with resistance from federal regulatory agencies. During a meeting with the regulatory agencies, staff was advised that the in-stream regional pond component would not receive permitting and any future regional facilities would require off-line construction. The regional in-stream pond component would have provided the greatest portion of storm water quantity and quality control for the protection of the reservoir. The inability to use this type of treatment, due to regulatory actions from federal agencies, greatly impacts the plan's performance.

As indicated in the previous the annual reports, the *Swift Creek Reservoir Protection Plan* originally scheduled for completion in the fall of 2011 has been postponed indefinitely. The 2012 Comprehensive Plan will allow the community and staff to refocus its efforts if determined necessary as part of the any new initiatives.

Upper Pocoshock Creek & Mid-Lothian Mines Park Stream Restoration Projects

As a result of the Chesterfield County's comprehensive Watershed Assessment and Stream Protection Program (WASP), the Pocoshock & Falling Creek watersheds were targeted in 2003 as priority streams requiring stream restoration practices and detail watershed investigations for pollution source(s) identification. The restoration was to provide compensation for unavoidable impacts to these jurisdictional streams due to proposed in-stream regional stormwater ponds. These ponds were to be constructed as part of the *Watershed Management Master Plan and Maintenance Program of the Swift Creek Reservoir Watershed*. Due to the modifications of the

current *Watershed Management Master Plan* as outlined above, alternative funding measures will be needed if the county elects to continue with its restoration plans.

Pocoshock Creek Stream Restoration Project

To assist in this effort the county in 2004 initiated the Pocoshock Creek Community Partnership. This is a coordinated effort between area residents, businesses and the county to improve water quality and physically restore portions of the creek that have become degraded. The stream restoration covers approximately 5,500 linear feet and should improve the functions and value of the impaired stream channel by improving water quality and aquatic habitat in the creek, establishing a geomorphically stable stream channel using natural channel design principles and reducing the sediment load carried from the creek to Falling Creek Reservoir. As part of this project the county contracted with KCI in 2003 for the development of design and construction plans for the stream restoration. In 2004, the county received the 30% construction design plan and the initial Corp of Engineers (COE) submittal package. No action was conducted on this project in 2012, progress towards this project will be reevaluated during 2013 in order assess the ability to proceed forward once the Mid-Lothian Mines Park Stream Restoration Project is under way.

Mid-Lothian Mines Park Stream Restoration Project

In 2010, the county received a VWPP Individual Permit Number 09-0471 for the Swift Creek Reservoir Watershed Management Plan, Site LTC 20/25 with Mid-Lothian Mines Park Stream Restoration. Site LTC 20/25 is a watershed level retention pond proposed along Little Tomahawk Creek to reduce pollutants from stormwater runoff and attenuate flows from the development of Charter Colony, a mixed-use community that was zoned in the mid-1980s. A stream restoration project has been proposed on the Mid-Lothian Mines Park as mitigation for the stream impacts and credits at the Virginia Habitats II Environmental Bank are proposed mitigation for the wetland impacts. The watershed level pond is part of the Watershed Management Master Plan and Maintenance Program for the Swift Creek Reservoir. The purpose of the Plan is to control pollutants from development and to ensure that an in-lake phosphorous limit of 0.05 milligrams per liter is not exceeded.

To assist in this effort, the county in 2009 initiated a Community Partnership. In 2010 this partnership was put on hold pending the issuance of VWPP. The county received its permit of the proposed project November 16, 2010. In 2012 the partnership will be reinitiated, construction plans finalized and bid documents developed with construction scheduled for the fall of 2013.

Continued Implementation of the Chesapeake Bay Preservation, Floodplain Management, Erosion & Sediment Control and Upper Swift Creek Watershed Ordinances

Regulatory Actions taken in 2012

In 2012, no regulatory amendments were publicly considered with respect to the county's Chesapeake Bay Preservation, Floodplain Management, Erosion & Sediment Control and Upper Swift Creek Watershed Ordinances. In 2008, staff brought forward language in order to address the development practice of mass grading. Due to general opposition, in 2009 staff continued

discussions with county administration and the development community to further address the need for the prohibition of unnecessary “mass grading”. No action has been taken to date.

In 2012- 2013, the county will begin steps necessary to implement the goals and guidelines as outlined in the Implementation chapter of the Comprehensive Plan. Staff has begun working on the steps identified, many of which will require significant citizen review and input prior to action by the Planning Commission and Board of Supervisors. Implementation will occur in two phases. The Board of Supervisors directed staff complete their work on Phase 1 steps by the end of July 2013. Some steps will require public participation and review and approval by either, or both, the Planning Commission and the Board of Supervisors. The undertaking of the Phase 2 implementation steps will occur based upon timing and direction from the Board of Supervisors. As recommended by the Plan, staff is currently working on developing scopes for each Phase 2 step and will be presenting a recommendation for the Planning Commission’s consideration in July 2013. As part of Phase 2, staff will address the issues outlined below:

WATER QUALITY - Amend ordinances to address:

1. Countywide application of Upper Swift Creek Ordinance standards such as setbacks from resource protection areas, reduction in the amount of impervious areas, and limited clearing in non-resource protection area floodplains.
2. Resource Protection Areas in open space for new developments.
3. Fertilizer and pesticide runoff from golf courses.
4. Adequate erosion and sediment control devices when removing trees for the purpose of preparing land for future development. This would not impact tree removal associated with timbering or forestry operations.

EROSION AND SEDIMENT CONTROL- Revise existing policies, where appropriate, to ensure that adequate erosion control measures are in place and properly maintained during development.

VIRGINIA STORMWATER MANAGEMENT PROGRAM - Develop ordinances and policies to ensure compliance with the program.

EDUCATIONAL PROGRAMS - Develop educational programs and where appropriate, partner with the community, schools and libraries to educate the public on:

1. Water conservation practices.
2. Water resource protection such as daily practices, low impact designs, stream and shoreline erosion.
3. Historical and cultural resources and preservation.

BEST MANAGEMENT PRACTICES (BMP) TEACHING OPPORTUNITIES IN CONJUNCTION WITH PUBLIC FACILITIES - Develop environmental awareness educational programs where appropriate at public facilities having water quality best management practices.

Erosion & Sediment Control for 2012

The current version of the Chesterfield County Erosion & Sediment Control Ordinance (Chapter 8, Sections 8-1 thru 8-17 “EROSION AND SEDIMENT CONTROL”) may be found in the County Code.

In 2010, the Departments of Environmental Engineering and Information Systems Technology implemented an in-house developed Program Administration Status System (PASS) to provide on-line records keeping for state mandated requirements for plans review, project inspection activities, frequency and regulatory performance reporting. In 2012, the PASS system was further improved to include specific details of field actions taken by inspectors during site inspections.

During written and verbal communications beginning in 2011 through 2012, in response an Administrative Penalty Complaint, the County advised the US Environmental Protection Agency (EPA) that Virginia law requires that the County first serve notice on offenders of the measures needed to correct an erosion and sediment control plan deficiency; and only upon a failure to timely correct the deficiency can the County serve the offender with a notice of violation. The County is bound by the enforcement timelines established by Virginia law. At the request of the EPA, County staff prepared administrative policies clarifying the specific procedures for addressing erosion and sediment control plan deficiencies and violations and added language to Section 6 (Civil Penalties) of the *Environmental Engineering Inspector's Guidance Manual* to formalize the steps of the enforcement process. These policies and the new language in the manual are reflective of the procedures which the Environmental Engineering Department already follows and are included in Appendix A for review.

Chesapeake Bay Preservation Ordinance for 2012

The current version of the Chesterfield County Chesapeake Bay Preservation Ordinance (Chapter 19, Article IV, Division 4, “CHESAPEAKE BAY PRESERVATION AREAS”) may be found in the County Code.

In 2012, the county continued its implementation of the Chesapeake Bay Act and made improvements to the review process for requests for encroachment within Resource Protection Areas (RPAs). The standard series of informational draft guidance documents used to standardize the review process were revised in 2012. Once finalized these draft documents and application will be available on the county website.

CBPA – Resource Protection Area Designations

Water Quality Section staff is responsible for the administration of the Resource Protection Area Designation process. Per the requirements of the Chesapeake Bay Act, this process identifies environmental features on parcels that require a Resource Protection Area (RPA). At the completion of the process, the identified features are mapped and the RPA boundary drawn around them. This process is completed prior to the tentative subdivision review, commercial site plan review and water quality impact assessments.

During 2012, 57 Resource Protection Area Designations were conducted. Water Quality Section staff, on behalf of landowners, performed 14 of these designations and 43 designations were field

verifications of private sector assessments. These efforts yielded approximately three miles of new perennial streams protected by Resource Protection Areas (RPAs). To date, approximately 906 miles of perennial streams are covered by RPA in Chesterfield County.

RPA Development for 2012

During the calendar year of 2012, 24 proposals for encroachment within the RPA were requested of the county. Of these, four requests required a formal exception before Board of Supervisors for approval. The remaining 24 requests met the requirements for administrative approval by either the Director of Environmental Engineering and/or the Water Quality Manager.

Formal Exception Status

In 2012 there were four proposed encroachment requests requiring formal approval before the county BOS Board of Supervisors. Two were for subdivisions and two were for commercial developments. Three of the four proposed encroachment cases were granted. The fourth proposed encroachment was withdrawn by the applicant prior to a decision.

Administrative Approval Status

The following is the status of the requests for encroachments within the RPA that require administrative approval.

Table 5. Status of 2012 RPA encroachment requests (administrative) in Chesterfield County.

Type of Encroachment	Number Requested	Description	Number Approved
19-236 - Expansion	5	Existing Structure	4
19-234a - Exempt Activities	2	Passive Recreation Trails	2
Permitted By Right	8	Water Dependent Activity (6) New Construction (0) Redevelopment (1) Private Driveway (1)	7
Buffer Modifications	9	Access (2) Views & Management (6) Shoreline Stabilization (1)	8

Floodplain Management Ordinance for 2012

The current version of the Chesterfield County floodplain management ordinance (Chapter 19, Article III, Division 3, "FLOODPLAIN DISTRICTS") may be found in the County Code. The regulation restricts construction in flood plains, to prevent loss of life and property, hazards to health and safety, disruption of commercial and government services and to limit the unnecessary or excessive expenditure of public funds for flood protection.

During the calendar year 2012, one administrative variance was granted. The variance granted was for a single-family residential home and pertained to encroachments within the county required structural setback (25 feet or within the Upper Swift Creek Watershed 35 feet) from the

existing floodplain boundaries. No public variances were brought before the county's Board of Zoning Appeal in 2012.

In 2010, as part of FEMA's Map Modernization program, Chesterfield County received its preliminary Digital Flood Insurance Rate Maps (D-FIRMs). The preliminary digital maps use the latest technologies in GIS to create a base map. The most significant changes are that the new maps will improve the accuracy of floodplain determinations and increase the ability to make updates. The county routinely updates the parcel layer using coordinate points for newly recorded streets subdivisions and parcel splits. The improvements in spatial accuracy and the new data information should greatly enhance the ability to use the D-FIRMs for planning, development, permitting and insurance purposes. The digital files (D-FIRMs) were made available to all residents at the end of the FEMA process through "Citizen GIS" that launched in May 2010. During 2011, the county initiated educational & outreach program meeting with interested county residents in order to discuss the potential impacts of the new D-FIRMS.

In 2012, Chesterfield County adopted amendments to Floodplain Management Ordinance in response to the Federal Emergency Management Agency (FEMA) map modernization program which provided for the automation of the existing system. The amendments allowed the county to maintain consistency with Federal and State requirements and provided for its residents continued participation in the National Flood Insurance Program (NFIP). The updated maps take advantage of revised data and improve technologies for identifying flood hazards, a better understanding of the actual risks, the ability to incorporate timely updates and to aid communities and residents in preparation of flood related disasters.

Upper Swift Creek Watershed Ordinance for 2012

The current version of the Chesterfield County Chesapeake Bay Preservation Ordinance (Chapter 19, Article IV, Division 5, "UPPER SWIFT CREEK WATERSHED") may be found in the County Code.

The Upper Swift Creek Watershed is located in the northwest corner of the county and consists of the land located upstream of the Swift Creek Reservoir Dam. The watershed drains to the Swift Creek Reservoir, one of the county's three drinking water sources. The boundary of Upper Swift Creek Plan amendment encompasses only a small portion of the 42,000 acres that make up the Swift Creek Reservoir Watershed. The headwaters of the watershed (approximately 7000 acres) are located in Powhatan County and therefore are not subjected to the plan.

In 1997, the Board established through ordinance, a phosphorus loading limit of 0.22 pounds per acre per year (lbs/ac/yr) for new residential development, and 0.45 lbs/ac/yr for nonresidential development. These loading limits were established by setting a 0.05 milligrams per liter (mg/L) in-lake phosphorus limit, and by calculating an allowable annual phosphorus input load. In past years, due to the sensitivity of this area, the county has targeted a number of initiatives to include regulations pertaining pre & post development practices and resource protection. In 2012, no modifications occurred to this ordinance.

Development Review for 2012

The county's Environmental Engineering and Planning Department staff review plans for proposed development for compliance with the above referenced ordinances. During the calendar year 2012, a total of 100 plans were approved between these two departments. Of this total 56 were for site plans, 22 for subdivisions and 22 were for other categories.

Enforcement Actions - CBPA - RPA Violations

In 2012, fifteen alleged RPA violation investigations were conducted. Seven required enforcement actions as a result of improper disturbance or clearing of the vegetation within the RPA. These identified projects required a site visit followed by the submission of a restoration plan. The plan outlined the area to be replanted or altered based upon the CBPA approved Water Quality Section's replanting guidelines. At the time of this report the cases were still on-going and had not been resolved therefore average length of time between the identification of the restoration project and the receipt of the corresponding approved corrective planting plan could not be determined.

Riparian Buffer Maintenance

Chesterfield Water Quality Section staff conducted five site inspections at prior buffer plantings: Swift Creek at Bailey Bridge Road, Swift Creek at Pocahontas State Park, Pocoshock Creek at Twilight Lane, Falling Creek at Meadowbrook Apartments and West Branch at Burnt Mills Lane. Each site was assessed for plant survival and maintenance needs. Tree tubes and stakes were removed from plants that did not survive and from those that no longer required shelter.

The Swift Creek site at Pocahontas State Park continued to show satisfactory progress. Improved maintenance practices have allowed the site to recover and naturally occurring plants and trees have become established. The site shows approximately 50-70% coverage.

The Swift Creek site at Bailey Bridge Road continued to show mixed results. Upland portions of the site show a strong survival rate (>60%) but the flood plain and areas planted in soils disturbed by prior utility construction demonstrate little success. Water Quality Section staff will consult with State Forestry personnel to create a remediation plan for this site.

The Pocoshock Creek site at Twilight Lane continued to show a high degree of success (>70%). In 2012, Environmental Engineering staff and volunteers removed more than 800 shelter tubes from trees that no longer needed protection. This site will be monitored in the future but Environmental Engineering staff anticipates that no further maintenance will be needed.

The sites at Falling Creek and Westbranch were both planted in 2010 as part of the Riparian Stewardship Program. Inspections in 2012 showed mixed results. The site on Westbranch at Burnt Mills lane exhibited a good overall success rate (>65%), however, Water Quality Section staff noted that some areas of the site had been disturbed by adjacent residents. Yard debris was piled on the northeast part of the planting area and several (approximately 20) trees were cut. Water Quality Section staff will consult with the residents in 2013 to prevent further interruption.

In the spring of 2012, Water Quality Section staff noted that the Falling Creek site at Meadowbrook apartments was severely impacted by improper grounds maintenance. All tree tubes had been removed and more than 50% of the trees were cut. Staff will seek to restore this area in 2013 and work with the property management staff to design an appropriate maintenance program.

Chesterfield County Environmental Management Policy Update

The August 31, 2007 update to Chesterfield County's Environmental Management Policy remains current and in effect. The environmental management policy is considered the foundation for the County's Environmental and Sustainability Management System (ESMS) and emphasizes a commitment to regulatory compliance, pollution prevention and continuous improvement, especially related to county property and facilities. A copy of this updated policy memorandum and letter is again included in Appendix A.

During January 2012, teams from Environmental Engineering and Capital Projects Management, completed training at Virginia Tech's ESMS Institute held at the Center for Organizational and Technological Achievement (COTA) in Roanoke, Virginia. Subsequent ESMS audits were conducted in August 2012 for the Environmental Engineering and Capital Projects teams by COTA staff as a final follow-up to the training program to ensure the continuing sustainability and effectiveness of the county's ESMS. Detailed reports are available from the Department of General Services – Environmental Division upon request.

(3) "A description of practices for operating and maintaining public streets, roads and highways and procedures for reducing the impact on receiving waters of discharges from municipal storm sewer system, including pollutants discharged as a result of deicing activities."

Operating and Maintaining Public Transportation

As has been reported in previous years, the Virginia Department of Transportation maintains 99% of the roads in Chesterfield County, and the county has no authority to regulate that agency. No changes to regulatory authority or processes were required or implemented in 2012.

Stormwater and Stream System Maintenance

The Department of Environmental Engineering's Drainage Section staff continues to maintain a database for recording storm water and stream system maintenance. The database tracks field installation events, and maintenance or repairs completed. The system also categorizes the service events according to the type of service performed (*i.e.* leaves removed, removal of downed trees, *etc.*). Similar to last year, the 2012 data showed that the majority of material removed from the system was vegetative debris and silt, with a very small fraction (approximately one percent) falling within the trash category. During 2012, Drainage Section staff performed maintenance activities on 38.25 miles of storm sewer infrastructure. Staff will

continue to review these reports and make any modifications to the Storm Water Management Program that are deemed necessary based on the information obtained.

County drainage easements are inspected at the time of state road acceptance. The county then holds a bond on those easements for 12 months after roads have been accepted into the state system. At the end of the 12-month period, another inspection is done and the developer is required to fix any problems before the bond is released. Maintenance from that point on is on a complaint driven basis. While there is no regular inspection process in place, Water Quality Section personnel look for problems in drainage easements when conducting field activities such as storm sewer mapping, outfall screening and detailed watershed investigations. Any problems found or areas in need of repair are then reported to the Drainage Superintendent.

(4) “A description of procedures to assure that flood management projects assess the impacts on the water quality of receiving water bodies and that existing structural flood control devices have been evaluated to determine if retrofitting the device to provide additional pollutant removal from stormwater is feasible.”

Flood Management Projects

Twenty five BMP and SWM facilities were certified in Chesterfield County in 2012 (Table 1). The stormwater management portions of these structures work to attenuate water flows. Maintenance on these and existing facilities are discussed in paragraph one of this report.

Chesterfield County Department of Environmental Engineering completed three major drainage improvement projects in 2012 to alleviate flooding and standing water in neighborhoods. The Laurel Road drainage project was a 900 foot installation of paved ditch and storm sewer and was installed at a cost of \$178,800. The Providence Forest Court drainage project was a 140 foot installation of a storm sewer and was completed at a cost of \$50,500. The Chesterwood-Cogbill Road drainage project was a 550 foot installation of paved ditch and storm sewer that directed approximately 33 acres of runoff into an existing BMP. Total cost for this project was \$276,000. Collectively these efforts improved stormwater drainage at 25 homes in Chesterfield County.

(5) “A description of a program to monitor pollutants in runoff from operating or closed municipal landfills or other treatment, storage or disposal facilities for municipal waste, which shall identify priorities and procedures for inspections and establishing and implementing control measures for such discharges.”

Municipal Landfills

As reported in prior annual reports, the county does not currently operate any municipal landfills. During the summer of 2012, as part of the county’s corrective action process, four additional seep drains were installed along the eastern side slope of the Carver Heights landfill in an effort to keep leachate from day-lighting and entering the stormwater conveyance system. While the seep drains have helped to minimize leachate day-lighting on the side slope, there are observable areas of flowing water into the stormwater conveyance system, particularly after rain events and

during periodic wet weather. In a continual effort to dewater these areas along the side slope, the county is removing approximately 4000 gallons of water from the seep trenches per month.

Additionally, as part of the county's corrective action process, the county is seeking to permit contaminated groundwater that is emerging as an upward component of groundwater within the conveyance system through the (VPDES) Virginia Pollutant Discharge Elimination System permitting process with the state of Virginia. The county is planning on utilizing two on-site ponds to biological treat contaminated groundwater before the water could potentially leave the site. Currently, the county is removing approximately 8000 gallons of water per month from a down gradient vault, in an effort to dewater this area.

The county operates and maintains two convenience centers for residents to dispose of household trash and debris, as well as offering many recycling opportunities. The Chesterfield County Department of General Services - Environmental Division oversees operations at these convenience centers. In 2012, no discharges to onsite stormwater systems were observed or reported at the two convenience centers. Detailed inspection reports are available through the Department of General Services - Environmental Division upon request.

(6) "A description of a program to reduce to the maximum extent practicable, pollutants in discharges from the municipal separate storm sewer associated with the application of pesticides, herbicides and fertilizer which will include, as appropriate, controls such as educational activities, permits, certifications and other measures for commercial applicators and distributors, and controls for application in public rights-of-way and municipal."

Targeted Education & Outreach regarding Pesticide, Herbicide and Fertilizer Use

General Public

Thousands of publications are distributed every year by both the Water Quality Section and the Chesterfield County Cooperative Extension Service regarding the proper use and disposal of pesticides, herbicides and fertilizers. Numerous publications are available to the general public regarding the home use of herbicides, pesticides and fertilizers and their effects on water quality. One such publication is *Six Steps to Cleaner Water*. A list of all water quality related publications is detailed in Table 3. These publications are available through a number of means including walk-ins, telephone requests, the Internet and seminars. In 2012, 103 residents registered for six lawn care seminars across the county that focused on using alternatives to turf, converting to warm-season turf, proper fertilizing and weed control strategies to protect water quality and conserve water. Additional seminar registrations include 240 registrants for seminars on various topics, including proper tree care and pruning, shade gardening, gardening with native plants, gardening for wildlife, preparing the garden for winter and appropriate plant selections. Native plants are better adapted to Chesterfield County's local climate and have less need for fertilizer and pesticide use.

The Chesterfield Cooperative Extension Office has once again implemented the Grass Roots program for county residents. In 2012, 353 residents participated in the program. This accounted for 473 soil samples analyzed and over 3,948,600 square feet of privately owned turf enrolled in program. Registration for this program is conducted on a first-come, first-serve basis.

Volunteer master gardeners make site visits to registered homeowners during which the master gardener measures the lawn(s), collects soil sample(s), and evaluates the health of the lawn. The Agriculture and Natural Resource Technician makes personalized fertilizer and pH adjustment recommendations to each homeowner stressing Integrated Pest Management (IPM) and the SON (September, October, and November) fertilizing program for cool-season lawns. The Grass Roots program provides numerous lawn care publications as needed and four quarterly newsletters. Turf enrolled in the Grass Roots program is included in the total square footage of turf under VADCR nutrient management plans.

In addition to providing valuable information to residents, the Chesterfield Cooperative Extension Office is conducting surveys among Grass Roots participants to evaluate lawn care practices such as timing for fertilizer application. In addition to providing valuable information to residents, the Chesterfield Cooperative Extension Office is conducting surveys among Grass Roots participants to evaluate lawn care practices such as timing for fertilizer application. Results of the most recent survey (2011) indicated that 89% of the respondents fertilized following the SON program, 89% actively kept lawn products out of the storm drain and 92% practiced integrated pest management (*i.e.* applying chemicals appropriately to lawn only after the problem was diagnosed).

The Water Quality Section and Chesterfield County Cooperative Extension Service also use the *List of Lawn Care Operators with Water Quality Agreements* that is maintained by the Virginia Department of Conservation and Recreation. This program certifies applicators of herbicides, pesticides and fertilizers who enter into a voluntary water quality agreement "by following proper lawn fertilization practices and recommending sound homeowner lawn maintenance practices by following a Nutrient Management Plan approved by VADCR". The lawn care companies also agree to teach their employees to use the Nutrient Management Plan to responsibly apply and handle lawn care products. There are currently 19 commercial lawn care companies in the Richmond area that serve Chesterfield County who are on the list. The list can be found at: http://www.dcr.virginia.gov/soil_and_water/documents/wqagree.pdf.

Commercial and Municipal Applicators

Both private and commercial applicators of pesticides are required by Code of Virginia (2VAC20-51-20) to hold a current Virginia Pesticide Applicator's Certificate, as regulated by the Virginia Department of Agriculture and Consumer Services (VDACS). Municipal applicators are included in the commercial, not-for-hire category. To become certified, the individual 1.) Must apply for a license; 2.) Submit a nonrefundable certification fee unless otherwise exempt, and 3.) Pass an examination that demonstrates the individual's education and training in pesticide application for a designated category appropriate for the type of pesticides used. After passing this examination, certified applicators are required to renew their certification every two years by attending a VDACS Board-approved recertification course during the two-year period. Approved recertification courses are offered by numerous organizations including Virginia Cooperative Extension. Currently, the Chesterfield County Agent participates in joint regional recertification programs that are conducted throughout the year at various locations including Chesterfield, Prince George, and Henrico Counties. Commercial pesticide applicators nearing the end of their two-year certification are notified by mail of the upcoming, qualified courses and urged to attend. The County Agent assisted with two 42-hour initial certification trainings with

J. Sergeant Reynolds Community College. Fourteen students took part in each of the two sessions for a total of 28 students in 2012. One session was held at the Cooperative Extension office in Chesterfield County and the other took place at J. Sergeant Reynolds Community College in Goochland County.

§122.26 (d)(2)(iv)(B)

“A DESCRIPTION OF A PROGRAM, INCLUDING A SCHEDULE, TO DETECT AND REMOVE ILLICIT DISCHARGES AND IMPROPER DISPOSAL INTO THE STORM SEWER”

The major tasks currently being implemented to conform to the above requirement are as follows:

- Water quality investigations and enforcement;
- Private sanitary system investigations and enforcement;
- Public sanitary system maintenance and repair
- Fire Department spill response;
- Storm drain marking program;
- Field screening evaluations;
- Detailed Watershed Investigations and Assessments, and;
- Management and Disposal of Used Oil and Toxic Materials.

(1) “A description of a program, including inspections, to implement and enforce an ordinance, orders or similar means to prevent illicit discharges to the municipal separate storm sewer system.”

Water Quality Investigations and Enforcement

The Department of Environmental Engineering - Water Quality Section staff performed 142 investigations in 2012 regarding water quality, spills, and other environmental concerns. These investigations are initiated by reports from residents, various county and state departments, or Water Quality Section staff. Of those investigations, 102 were illicit discharge investigations, 37 were other water quality or environmental concerns, and 3 were municipal sewage releases to surface or storm water systems. Figure 1 depicts the numbers and categories of investigations conducted by Water Quality Section staff. A summary of all water quality investigations conducted in 2012 is included in Appendix A.

The number of investigations conducted represents more than a doubling from prior years. This significant increase in total investigations is largely due to increased field presence by new staff hired by the department. An employee hired in early 2012 was assigned to perform water quality investigations and enforcement, commercial/industrial inspections, and Resource Protection Area investigations. This employee is also overseeing the illicit discharge detection and elimination program, for which a second employee was hired in late 2012.

The 102 illicit discharge investigations were divided into six categories, as illustrated in Table 6. The organics category included sewage from non-municipal releases, waste cooking oil or compost spills at food service establishments, and liquid drippings from trash trucks. Examples of the chemical category included discharges from swimming pools and antifreeze spills. The hydrocarbon category represented releases from automobile accidents, auto repair shops, home vehicle repair, and home heating oil. The miscellaneous category included dumping of tires and

trash, washing of concrete residuals, and dumping of construction debris into storm or surface water systems. The mopwater/washwater category included improper discharges from mobile and fixed vehicle washing, restaurant cleaning, and the cleaning of construction tools and industrial equipment.

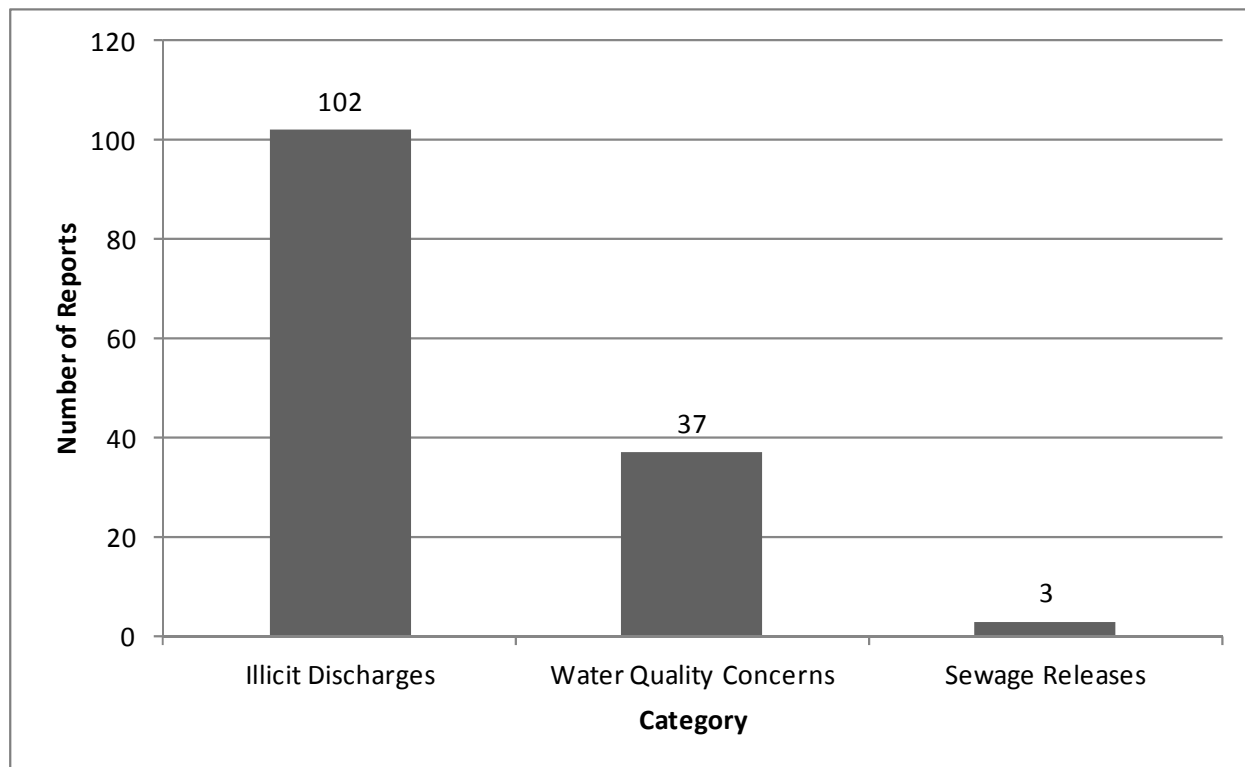


Figure 1. Number and types of water quality investigations, 2012

Table 6. Potential illicit discharge reports responded to during 2012.

Category	Number	Frequency Observed (%)
Mopwater/Washwater	36	35
Leaves/Sediment	26	25
Organics	16	16
Chemical	10	10
Hydrocarbon	8	8
Miscellaneous	6	6

In some cases multiple Notices of Violation (NOV) were issued for a given incident; for example, property owner, tenant, and contractor were all eligible to receive NOVs. A total of 62 NOVs representing 54 incidents were issued in 2012 as enforcement actions of the Illicit Discharge Ordinance.

The category of water quality concern represented a variety of environmental issues, often resulting in referral to other sections within the county or other state and federal agencies after investigation by Water Quality Section staff. A notable water quality concern addressed this

year included the presence of roosting cormorants on an island in the Swift Creek Reservoir. This category also included more routine referrals such as missing manholes, inquiries about iron bacteria, algal blooms, illegal dumping not associated with surface or storm waters, drainage or erosion concerns, and the filling of wetlands or other waterbodies best addressed through remedies other than the Illicit Discharge Ordinance.

Three of this year's investigations were at municipal sewage releases. Two of the municipal sewage releases were identified by Water Quality Section staff during field investigations, while they were asked by the Department of Utilities to assess the extent of the sewage release at the third incident. When necessary, samples were collected and analyzed for *E. coli* bacteria in the receiving waterbody. When appropriate, signs were posted to indicate that a sanitary sewer release had occurred in order to warn residents to avoid the immediate area. Re-sampling occurred approximately one week after repairs were made to confirm levels of bacteria had dropped to normal background concentrations. Signs were removed once bacteria concentrations were low. This process has been found to be effective in previous years and will continue to be used in the future.

Private Sanitary Systems Investigations and Enforcement

The Virginia Department of Health, Chesterfield Health District is tasked with responding to complaints and issues regarding private sanitary systems (septic tanks and drainfields) in Chesterfield County. Although many of these may not directly impact the county stormwater system, many have the potential to substantially affect groundwater and some on occasion do discharge directly to Chesterfield County's MS4 and surface waters. As a result, data regarding Department of Health efforts as they may relate to preventing illicit discharges are included in this report. In 2012, Chesterfield Health District investigated 65 septic complaints and issued 160 onsite sewage repair permits in the county. As a result of the complaint responses, investigations and onsite inspections, Chesterfield Health District issued a total of 43 Notices of Alleged Violation during 2012. Additionally, the Health District received documentation relating to 5,459 septic tank pump outs and 307 Alternative Onsite Sewage System (AOSS) inspections conducted in the county during 2012.

Public Sanitary System Maintenance and Repair

The Department of Utilities - Wastewater Collections Division maintained approximately 1,970 miles of sanitary sewer lines and responded to seven reportable public sanitary sewer incidences during 2012. Accumulation of grease in the lines was the most common factor resulting in the blockages and stoppages. In all of the incidents related to grease, the lines were cleaned or repaired and added to a preventive maintenance "trouble spot" list. Copies of the incident reports submitted to the Virginia Department of Environmental Quality are included in Appendix A.

Fire Department Spill Response

The Chesterfield County Fire Marshal's office reported seven occurrences in 2012 where Fire Department personnel were dispatched to address incidences involving either the direct release

of product to the county stormwater system or where there was a high probability a release would occur if not immediately remediated (Table 7).

Table 7. Responses by Chesterfield County Fire and EMS involving MS4, 2012

Date	Address	Event	Product	Source
01/12/12	8201 Hull Street Road	Spill	~ 10 Gallons Gasoline	Fuel Pump
03/10/12	W. Huguenot Road & Cranbeck Road	Leak	Large Volume of Diesel Fuel	Ruptured Fuel Tank – Truck
04/27/12	Harrowgate Road & Cougar Trail	Leak	Vehicle Fluids in Roadside Ditch	Automobile Accident
06/07/12	3407 Oakmeadow Lane	Release	2'x4' Puddle – Used Motor Oil	Deliberate Dumping
09/21/12	Route 295 South & West Hundred Road	Spill	~ 50 Gal. Diesel Fuel	Ruptured Side Tank – Truck
11/07/12	S. Chippenham Parkway & Rt 10	Leak	Diesel Fuel on Road Shoulder	Ruptured Fuel Line
11/29/12	2116 Willis Road	Spill	Hydraulic Fluid	Construction Equipment

Of these seven, five were related to vehicle fuels released due to accidents, ruptured fuel tanks/lines or pump malfunctions, one was the release of hydraulic fluid as the result of a crash involving construction equipment and one was related the deliberate dumping of motor oil. In these events, cleanup was immediate resulting in no release to the county's stormwater system. In all listed incidents, fire personnel secured the site and contained the product with subsequent mitigation and cleanup operations performed by either HAZMAT personnel or commercial contractors. In addition, Chesterfield Fire Department personnel responded to multiple incidences during the course of the year involving insignificant fluid releases from vehicle crashes not impacting the stormwater system. In these cases, absorbents were applied to prevent the spread of the fluids and clean up was conducted as required. Detailed reports of each incident are archived and are available for review at the Fire Marshal's office.

Storm Drain Marking

During 2012, a total of 523 storm drain placards were installed by the Volunteer Storm Drain Marking program. Details of this program are presented in §122.26 (d) (2) (iv) (A) (1) *A Description of Structural and Source Control Measures to Reduce Pollutants from Runoff from Commercial and Residential Areas that are Discharged from the Municipal Storm Sewer System* of this report.

Department of Environmental Engineering staff placed an additional 95 placards on inlets as part of a Supplemental Environmental Project begun in 2012. The Supplemental Environmental Project also includes distribution of spill kits and pamphlets describing Best Management Practices to food service establishments and auto repair facilities.

A total of 618 storm drain placards were installed throughout Chesterfield County in 2012.

(2) “A description of procedures to conduct on going field screening activities during the life of the permit, including areas or locations that will be evaluated by such screens.”

Field Screening Evaluations

The Water Quality Section staff continues to implement the illicit discharge detection and elimination field screening program. The purpose of this program is to identify and investigate non-storm water flows that are entering the county’s storm sewer system, and to eliminate those non-storm water flows if they are not one of the authorized discharges allowed by the county Illicit Discharge Ordinance. This program was designed using the recommendations of the Center for Watershed Protection’s *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, October 2004.

In 2012, a total of 34 outfalls and seven upstream structures were screened using protocols described in the County’s *Outfall Reconnaissance Inventory Standard Operating Procedures Addendum* (last revised 01/23/2012). Of the 34 outfalls screened, four outfalls (11.7%) were characterized as outfalls with potential illicit discharges. Follow-up visits to these outfalls have been scheduled for early 2013.

The following is a brief summary of the Field Screening Standard Operating Procedure:

1. A desktop evaluation is performed to identify specific locations or drainage areas with significant potential to contain contaminated dry weather flows, and to identify areas that have not been screened in recent prior years.
2. Field screening of physical and chemical parameters is conducted to identify those outfalls with dry weather flows or indicators of contaminated intermittent flows at non-flowing outfalls.
3. Detailed investigations are conducted when contaminated flows are identified or suspected in order to identify the source(s) of the contamination. These detailed investigations may require source tracking, dye testing, and other investigatory methods.
4. Pollutant sources are eliminated when identified, under the authority of the Illicit Discharge Ordinance and other regulations and codes.

The field inspection process consisted of collecting general information and a description of the outfall and upstream system. For the outfalls exhibiting dry weather flows, additional instream physical and chemical measurements were obtained through field and laboratory analysis of samples, using a two-tiered testing regime of indicator parameters. All dry weather flows were field analyzed with a Hydrolab Minisonde 4a for the following parameters: dissolved oxygen, pH, conductivity, total dissolved solids, and temperature. Additionally, samples from all dry weather flows were laboratory analyzed for the following tier one parameters: ammonia nitrogen, nitrate+nitrite nitrogen, phosphate phosphorus, turbidity, fluoride, potassium, and calcium hardness. Some dry weather flows were analyzed for one or more additional parameters, the tier two parameters, which include: alkalinity, *E. coli*, nitrite, surfactants, and total chlorine.

Field observations and data collected from both field and laboratory results were archived to the Outfall Screening Database. Copies of completed field screening outfall inspection check sheets from the 2012 reporting year can be found in Appendix A.

In addition to the 34 outfalls screened, seven upstream storm sewer facilities were inspected at outfalls where additional investigation was warranted. For example, some outfalls were submerged in streams and ponds so obtaining a sample representative of the outfall flow was not possible. In these cases, pipes and inlets upstream of the outfall where flow was present were evaluated. Of the total 41 inspected structures (including outfalls and upstream structures), eight (19.5%) had dry weather flows or standing water at the outfall pipe. Field evaluations were conducted at all 41 structures, and the eight with dry weather flows were analyzed for field and, at a minimum, tier one laboratory parameters. A table summarizing the chemical data from these outfalls can be found in Appendix A.

Results from the field and laboratory analyses were compared to current state water quality standards and literature based reference values to determine violations/discrepancies. Due to the sporadic nature of contaminants within dry weather flows, results for the chemical analyses were also compared to USEPA recommended values and to previous observations. If it was determined that a site exceeded the applicable water quality standard or reference value, a detailed investigation was considered to determine the source(s) of contaminants.

In October 2012, a new staff member was hired with a primary job function to screen outfalls. In December 2012, Water Quality Section staff began to compose a Sampling and Analysis Plan to describe in greater detail the process of selecting outfalls to be screened, the collection of field samples and the subsequent analysis of samples in the laboratory. This Sampling and Analysis Plan will be completed in 2013. Additionally, detailed watershed investigations will be incorporated into the outfall reconnaissance program in 2013, which will include identifying “hotspots” (sites that have elevated potential for producing illicit discharges) throughout the watersheds under investigation.

In addition to the outfall screenings conducted by Water Quality Section staff, the county’s Office of Environmental Management has retained the services of the consulting firm Koontz-Bryant, P.C. to monitor stormwater outfalls at the Chesterfield County airport complex. This monitoring is conducted to fulfill requirements of the airport’s VPDES Industrial Stormwater General Permit and is included in this report as the stormwater outfalls drain to county waters. During 2012, staff from Koontz-Bryant visually monitored eight outfalls on a quarterly basis at the county airport complex for a total of thirty-two outfall screenings.

Generally, the results of the outfall screenings indicated no significant issues related to stormwater discharges. The excessive vegetation growth within the concrete channel of Outfall #6 noted during the preceding August and October 2011 inspections was cleared by the January 2012 assessment allowing natural flow to resume. Brown and cloudy water was noted at Outfall #6 during August 2012 and at Outfalls #1 and #2 during October 2012. This observation was attributed to heavy rains and associated increased flows washing fine soil particles into the receiving channels.

During the August inspection an oily sheen and odor was noted at Outfall #3 along with water discharging to the airport fuel farm's oil/water separator. The inspection revealed that the airport fuel farm containment area's butterfly drain valve was faulty and was leaking while closed, allowing stormwater to enter the oil/water separator. Airport staff was notified of this unsatisfactory condition and repairs were underway by the October inspection. The faulty butterfly valve was replaced with a gate valve on December 9, 2012 completing repairs to the airport fuel farm containment area.

On May 22, 2012 personnel from Koontz-Bryant visited with airport staff and conducted an onsite annual Stormwater Pollution Prevention Plan (SWPPP) compliance evaluation. The evaluation included reviews of existing worksheets and plans, inspections of spill response equipment and visual assessments of the eight outfalls. The results of this evaluation indicated there were no incidents of non-compliance identified for Fiscal Year 2012 and that the airport was meeting the requirements of the facility's SWPPP and related VPDES discharge permit. Copies of the quarterly reports submitted to the county and the compliance evaluation are included in Appendix A for review.

Chesterfield County operates an outdoor firearms range at the Public Safety Training Area near Enon for law enforcement personnel weapons training and qualification. Concerns over soil accumulation of lead residue from bullets and the consequent discharge of stormwater containing and transporting lead along the effluent stormwater channel to Johnson Creek prompted annual monitoring of these areas. Since 2005, Chesterfield County's Department of General Services – Environmental Division has contracted for sediment sampling of the stormwater channel draining the onsite stormwater management basin and of Johnson Creek for lead. Six soil samples along the stormwater channel and four instream sediment samples of Johnson Creek were obtained on November 9, 2012, analyzed for lead, and compared to previously obtained values. Lead concentrations among the ten sites surveyed ranged from <4.3 to 32 mg/Kg and were evaluated as similar to previously observed values. All of the measurements recorded were substantially lower than the 400mg/Kg human health risk based screening level for residential scenarios and the 800mg/Kg human health risk based screening level for commercial exposure scenarios recognized by Virginia Department of Environmental Quality. To date no sample has exceeded 100 mg/Kg. These results suggest limited lead impact to the stormwater channel and to Johnson Creek. A complete copy of the sediment sampling report is included in Appendix A for further review.

(3) “A description of procedures to be followed to investigate portions of the separate storm sewer system that, based on the results of the field screen, or other appropriate information, indicate a reasonable potential of containing illicit discharges or sources of non-storm water (such procedures may include: sampling procedures for constituents such as fecal coliform, fecal streptococcus, surfactants (MBAS), residual chlorine, fluorides and potassium)...”

Detailed Investigations and Watershed Assessments

Marine Spring Branch

A detailed watershed investigation of Marine Spring Branch was conducted on June 25 and August 2, 2012 in response to an unusual high exceedance of the *E. coli* bacteria water quality standard observed in sampling efforts by a WaterTrends volunteer. The goal of the investigation was to identify the segment within the watershed contributing the high bacterial loads. This information could then be used to identify whether a septic system or sanitary sewer line was the likely cause, and eventually identify the specific repair needed. These methods are typically known as source tracing and bracketing in illicit discharge detection methodology.

Marine Spring Branch is a small watershed (approximately 700 acres) in the northwest corner of the county. The main branch is approximately two miles long, with several miles of tributary branches and piped storm systems flowing in. Two headwater branches originate in relatively flat terrain, then flow through ravines before combining and flowing across moderately graded terrain. The storm water system is composed of surface and subsurface man-made structures flowing to a natural stream. Much of the stream is classified as County Floodplain and/or Resource Protection Areas.

Most of the watershed is zoned residential (R-40, R-25, R-15). A small portion (approximately 34 acres) of the watershed in Chesterfield County is zoned agricultural, but that portion is downstream of the area the volunteer monitored and this watershed investigation was focused. There are no properties zoned commercial, office, or industrial in the watershed. All homes in the watershed are served by municipal drinking water sources. Most (80%) homes are connected to the municipal wastewater system.

The investigation was performed over two days because a thunderstorm disrupted the first day's efforts. Two Water Quality Section staff members conducted the investigation. Three sites in the upper section and two sites in the middle section of the watershed were visited on the first day. Five sites in the lower section, two sites in the middle section, and one site in the upper section were visited on the second day. The same two middle section sites were visited on both days.

A Hydrolab Minisonde4a was used to collect field data for dissolved oxygen, temperature, pH, total dissolved solids and conductivity. Water samples were analyzed in the laboratory for ammonia, fluoride, surfactants and *E. coli* bacteria using the same methods as for the illicit discharge detection program. Similarly, Outfall Reconnaissance Inventory/Sample Collection Field Sheets were completed at every location (Appendix A). Field and laboratory results are listed in Table 8.

The field and laboratory results from the first day suggested that the water quality in the upper and middle watershed sections was generally good. The outfall screening indicators suggested that nutrients could be an issue due to the presence of benthic growth. Fish and snakes were observed at the main branch middle watershed section site, confirming that habitat suitable for wildlife was present.

Moderately high conductivities and fluoride concentrations were found in the lower section on the second day. None of the sites exceeded the water quality standard for *E. coli* bacteria, although the main channel in the lower section was close at 220 CFU/100ml. Surfactant and ammonia concentrations were low throughout the watershed.

Fluoride concentrations suggest that much of the water in the stream, especially in the lower watershed, was coming from municipal sources. Given that the highest conductivities and fluoride concentrations occurred in the lower watershed where buffers between homes and the stream were smallest, and where land cover is predominantly grass as compared to the more forested upper watershed, the fluoride and conductivity were likely from lawn watering and fertilizer use. Our investigation did not find evidence of a point source of *E. coli* bacteria such as a broken sewer line or failing septic system.

Table 8. Marine Spring Branch water quality results summer 2012. Not Measured (NM), Not Flowing (NF) and Trace (T) are notated accordingly.

Station	Date	Time	Field measurements						Lab measurements				Station Description	Section
			D.O. mg/L	D.O. %	pH	Cond. µS/cm	TDS mg/L	Temp. °C	F mg/L	NH3 mg/L	MBAS mg/L	E. coli CFU/100ml		
MSB1	6/25/2012	1130	9.26	103.0	5.98	100	0.0640	20.3	0.07	0.00	0.1 T	0	Eastern outfall to mainstem headwaters	Upper
MSB2	6/25/2012	1140	NM	NM	NM	NM	NM	NM	0.13	0.00	T	60	Center outfall to mainstem headwaters	Upper
MSB3	6/25/2012	1150	NF	NF	NF	NF	NF	NF					Western outfall to mainstem headwaters	Upper
MSB4	6/25/2012	1420	7.63	92.5	6.70	88	0.0571	24.7	0.22	0.00	0.00	120	Mainstem u/s of junction with major tributary	Middle
MSB5	6/25/2012	1430	7.08	83.6	6.73	92	0.0593	23.3	0.11	0.00	0.00	80	Major tributary from Brigstock Road	Middle
MSB4	8/2/2012	1300	7.58	92.5	6.80	100	0.0636	25.3	0.20	0.01	0.00	20	Mainstem u/s of junction with major tributary	Middle
MSB5	8/2/2012	1310	3.41	40.6	6.48	102	0.0649	24.0	0.21	0.05	0.00	120	Major tributary from Brigstock Road	Middle
MSB6	8/2/2012	1111	15.03	218.2	9.42	311	0.1985	35.4	0.72	0.03	0.20	100	Eastern tributary from Kings Farm Drive	Lower
MSB7	8/2/2012	1127	15.70	212.6	7.57	455	0.2910	31.2	0.72	0.02	0.20	40	Western tributary from Derby Ridge Way & Arborcraft	Lower
MSB8	8/2/2012	1140	7.73	92.8	7.14	266	0.1702	24.4	0.52	0.03	0.12	220	Robious Road - Mainstem u/s of foot bridge	Lower
MSB9	8/2/2012	1157	11.15	143.5	8.29	103	0.0655	28.3	0.28	0.00	0.00	60	14050 Riverdowns South Drive - Mainstem	Lower
MSB10	8/2/2012	1221	7.77	97.2	7.13	286	0.1827	26.8	0.36	0.01	T	120	3518 Kings Farm Drive - Outfall from south	Lower
MSB11	8/2/2012	1335	7.85	94.4	6.62	97	0.0620	24.5	0.30	0.01	0.00	100	13501 Trilithon Road - Mainstem d/s of E Brigstock Road	Upper

Detailed Watershed Assessments of County Stream Systems

Watershed level assessments were conducted within three drainage basins in 2012; four stream sites draining directly to the Appomattox River, six stream segments draining directly to the James River and at five reaches within the Michaux Creek watershed. The major reason for the selection of these watersheds was limited data regarding detailed water quality in these drainage systems. Additionally, these three watersheds contained stream segments currently listed on Virginia's impaired waters list (303d) as impaired for either not supporting aquatic life (low pH) or recreational contact (*E. coli* bacteria).

Sampling occurred in the spring as a component of the county's Watershed Assessment and Stream Protection Program (WASP). Physical, Chemical, Biological, and Habitat data were collected and analyzed. Results were integrated into a multivariable approach that synthesized the bioassessment and habitat categorical data as well as select chemical observations into a single water quality index score, comparable as a percentage of an ideal reference condition (100%). The results of this analysis are outlined in Table 9. The majority of the assessments indicated either poor (n=2) or fair (n=8) water quality conditions. Details concerning individual sites are summarized and presented in Section 2.1 of this report entitled "*2012 Assessment of the Biology, Habitat and Chemistry of Select Streams and Watersheds of Chesterfield County, Virginia.*" Details about the development of the scoring protocol are discussed in section five ("*Identification of Water Quality Improvements and Degradation*") of this report.

Table 9. Water quality scores and categories for assessed watersheds, 2012.

Site Number	Stream	Station Location	Date	% Comparison to Reference Condition	Water Quality
APR-01	Fleets Branch	On VSU Campus Downstream of East River Road	03/27/12	22.2	Poor
APR-02	Stoney Creek	Downstream of Trents Bridge Road	03/27/12	88.9	Excellent
APR-03	Tributary to Appomattox River	Downstream of St. Audries Drive	03/27/12	66.7	Good
APR-04	Cattle Creek	Downstream of Ivey Mill Road	03/28/12	77.8	Very Good
JR-04	Spring Creek	Downstream of Old Gun Road East	04/05/12	44.4	Fair
JR-05	Tributary to James River	Downstream of Ashwell Drive	04/05/12	33.3	Poor
JR-06	Tributary to James River	Robious Landing Park East of James River Road	04/03/12	44.4	Fair
JR-07	Tributary to James River	Robious Landing Park West of James River Road	04/03/12	55.6	Fair
JR-08	Marine Spring Branch	Downstream of Kings Farm Drive	04/03/12	55.6	Fair
JR-09	Roberts Branch	Upstream of Crossings Way	04/05/12	55.6	Fair
MCX-01	Michaux Creek	East of RT288	03/28/12	66.7	Good
MCX-02	Tributary to Michaux Creek	East of RT288 - Upstream of MCX-01	03/28/12	88.9	Excellent
MCX-03	Tributary to Michaux Creek	Southwest of North Otterdale Road	03/29/12	55.6	Fair
MCX-04	Tributary to Michaux Creek	Downstream of Lastingham Drive	03/29/12	44.4	Fair
MCX-05	Michaux Creek	End of North Otterdale Road	03/29/12	44.4	Fair

(6) A description of educational activities, public information activities and other appropriate activities to facilitate the proper management and disposal of used oil and toxic materials.

Management and Disposal of Used Oil and Toxic Materials

The Department of General Services operates a public household hazardous waste program by offering the disposal of items such as paint, oil base paint, varnish, thinners, shellac, stains, tints, polyurethane, primers, varsol, mineral spirits, turpentine, various flammable solvents, oil additives, gasoline, used oil, diesel fuel, kerosene, brake fluid, anti-freeze, oil filters, pool and photo chemicals, pesticides and herbicides. The county collects the waste and contracts with a qualified firm for proper disposal or recycling. Information regarding this program is available on the county website. Additionally, brochures are available for residents by request and are distributed at special events.

During 2012 approximately 68,235 pounds of used motor oil from Chesterfield County's Fleet Management Facilities were recycled either through FCC Environmental or used as fuel at five county clean burn furnaces. Additionally, 5,263 pounds of used antifreeze and 25,050 pounds of

oil solids, including crushed oil filters and absorbents were collected and recycled through FCC Environmental Services. Nine oil water separator systems, one of which discharges directly to the county's storm water system, were inspected and cleaned in May and November 2012. Aboveground oil storage tanks and piping were inspected on a monthly basis. There were no reportable oil spills in 2012 at any of the Chesterfield County Fleet Management Facilities as defined by the SEPAL in the Clean Water Act and Oil Pollution Act. Detailed inspection reports are available through the county's Fleet Management Division upon request.

Chesterfield County operates a Public Safety Training Area near Enon for the training of law enforcement and fire personnel. The area is comprised of specific areas for police and fire staff to conduct training specific to their respective operations. Examples of activities conducted here include firearms training, an emergency vehicle operations (driving) course and fire fighting/suppression procedures. A limited amount of hazardous materials are present on site to facilitate the training. The use and disposal of these materials are addressed in detail within the Environmental Handbook- Standard Operating Procedures documents for the Enon Police Training Facility and the Enon Fire Training Facility.

§ 122.26 (d)(2)(iv) (C)

“PROGRAM TO MONITOR AND CONTROL POLLUTANTS IN STORMWATER DISCHARGES TO MUNICIPAL SYSTEMS FROM MUNICIPAL LANDFILLS, HAZARDOUS WASTE TREATMENT, DISPOSAL AND RECOVERY FACILITIES, INDUSTRIAL FACILITIES SUBJECT TO 313 OF TITLE III (SARA), AND INDUSTRIAL FACILITIES THAT THE MUNICIPAL PERMIT APPLICANT DETERMINES ARE CONTRIBUTING A SUBSTANTIAL POLLUTANT LOADING TO THE MUNICIPAL STORM SEWER SYSTEM”

(1) “A program to identify priorities and procedures for inspections and establishing and implementing control measures for such discharges.”

Facility Inspections

Thirty-nine commercial and industrial facilities were inspected for stormwater compliance purposes during 2012 (Table 10), and an additional thirteen industrial facilities were toured by the stormwater inspector whom provided recommendations on stormwater issues. The stormwater inspector also routinely conducted informal inspections of commercial and industrial facilities and found many of the incidents described below in “Releases from Commercial/Industrial Facilities” as a result.

As a means of prioritizing facilities for inspection, businesses have been categorized numerically from one (least potential) to five (greatest potential) based upon their risk to the environment. Inspection protocol requires facilities that are categorized “5” or “4” be given top priority and must be inspected at least annually. The following list describes facilities within each category.

- “Category 5” is assigned to facilities that are a combination of, handling hazardous materials, collecting waste for treatment, disposal or recovery, having a NPDES/VPDES permit, SARA Title III facilities, facilities that have had releases in the past or any combination of the aforementioned criteria.
- “Category 4” is assigned to facilities that either have a NPDES/VPDES permit, SARA Title III facility, handles hazardous waste or an operating or closed municipal landfills.
- “Category 3” is assigned to facilities that have a potential, because of their type of business, for an illicit discharge such as automobile service centers. These facilities require an inspection bi-annually.
- “Category 2” is assigned to facility types that have been known to have an occasional discharge such as restaurants. These facilities require inspections on as needed bases.
- “Category 1” is assigned to facility types that have little or no chance of an illicit discharge such as office complexes. These facilities do not require inspections but are maintained in the Industrial Inspection Data base for tracking purposes.

Table 10. Facility inspections performed in 2012.

Date	Facility	Category	Site Address	Reason for Inspection
2/14/2012	Chik-Fil-A	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	Cici's	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	Five Guys	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	McAlister's	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	Noodles and Company	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	Plaza Azteca	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	Regal Cinemas	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	Sedona Tap House	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	Starbucks	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	Sweet Frog's	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	Tropical Smoothie	2	Westchester Commons	Routine Commercial Inspection
2/14/2012	AT&T	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Books A Million	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Cigarettes America	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Dollar Tree	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	DOTS	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Dress Barn	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Edward Jones	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Encore Studio	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Escape Massage	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Famous Footwear	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Game Stop	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	GNC	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Gold's Gym	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Great Clips	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Haircuttery	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Hush Fine Lingerie	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Jo-Ann Fabrics	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	LT Nails	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Mathnasium	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Maurice's	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Office Max	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Payless Shoe Source	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Petco	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Sleepy's	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Solar Nails	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Target	1	Westchester Commons	Routine Commercial Inspection
2/14/2012	Verizon	1	Westchester Commons	Routine Commercial Inspection
4/5/2012	Maruchan Virginia, Inc.	3	8101 White Pine Road	Pretreatment Annual Inspection
4/11/2012	Honeywell Resins and Chemicals, LLC	5	4101 Bermuda Hundred Road	Pretreatment Annual Inspection
4/25/2012	Industrial Chemicals, Inc.	3	2540 Bellwood Road	Pretreatment Annual Inspection
4/25/2012	Magellan Systems International, LLC	3	8100 Shell Road	Pretreatment Annual Inspection
5/10/2012	Wako Chemicals USA, Inc	5	1600 Bellwood Road	Pretreatment Annual Inspection
5/23/2012	Fiorucci Foods Inc.	2	1800 Ruffin Mill Road	Pretreatment Annual Inspection
6/6/2012	Shoosmith Bros. Inc. Sanitary Landfill	4	11800 Lewis Road	Pretreatment Annual Inspection
6/6/2012	Shoosmith Bros. Inc. Truck Washing Facility	2	11800 Lewis Road	Pretreatment Annual Inspection
6/21/2012	AlSCO Inc	3	1701 Touchstone Road	Routine Industrial Inspection
7/5/2012	Chik-Fil-A	2	Westchester Commons	Follow-up Commercial Inspection
7/5/2012	Cici's	2	Westchester Commons	Follow-up Commercial Inspection
7/5/2012	Five Guys	2	Westchester Commons	Follow-up Commercial Inspection
7/5/2012	McAlister's	2	Westchester Commons	Follow-up Commercial Inspection
7/5/2012	Noodles and Company	2	Westchester Commons	Follow-up Commercial Inspection
7/5/2012	Plaza Azteca	2	Westchester Commons	Follow-up Commercial Inspection
7/5/2012	Regal Cinemas	2	Westchester Commons	Follow-up Commercial Inspection
7/5/2012	Starbucks	2	Westchester Commons	Follow-up Commercial Inspection
7/5/2012	Sweet Frog's	2	Westchester Commons	Follow-up Commercial Inspection
7/5/2012	Tropical Smoothie	2	Westchester Commons	Follow-up Commercial Inspection
7/5/2012	Solar Nails	1	Westchester Commons	Follow-up Commercial Inspection
7/25/2012	Aleris Rolling Products, Inc	4	1601 Reymet Road	Pretreatment Annual Inspection
8/9/2012	One Stop Auto	3	8311 Midlothian Turnpike	Routine Commercial Inspection
9/19/2012	Sabra Dipping Company LLC	3	15900 Sabra Way	Pretreatment Annual Inspection
10/25/2012	Honeywell International, Inc.	4	15801 Woods Edge Road	Pretreatment Annual Inspection
11/6/2012	MGC Advance Polymers, Inc.	5	1100 Port Waltham Drive	Pretreatment Annual Inspection
11/6/2012	Eternal Technology Corporation	4	1800 Touchstone Road	Pretreatment Annual Inspection

Thirty-eight “Category 1” and “Category 2” businesses and stormwater treatment facilities at the Westchester Commons Shopping Center (Westchester) were inspected on February 14, 2012. Westchester was constructed in 2008 and consists of large box retail (Target, Petco, Office Max, Jo-Ann, Books-A-Million), a movie theater (Regal Cinema), smaller retail and service establishments and restaurants. Additionally, there are ten out-parcels consisting of two banks, a restaurant, and seven cleared and graded but undeveloped parcels. This facility was chosen because of an improper discharge from one business to the stormwater system in 2011. The total land area is approximately 131 acres, with approximately 6 forested acres surrounding a stream and jurisdictional wetland feature receiving some stormwater and 5 acres divided between two stormwater retention ponds. Water Quality Section staff conducted a routine commercial inspection of the shopping center, screened four stormwater outfalls, and visually surveyed approximately thirty-four drop inlets, two rain gardens, two Filtterra® systems, three StormFilter® vaults, and one standalone StormFilter® unit. Water Quality Section staff required eight corrective actions to bring the businesses and stormwater treatment facilities into compliance. Another twenty-three corrective actions were recommended as preventative measures to keep the facilities in compliance. Follow-up inspections were conducted at eleven businesses on July 5, 2012 to ensure required actions had been completed.

One industrial inspection of a “Category 3” business was conducted on June 21, 2012 as follow-up to a pollution complaint response on May 24, 2012. The facility, Alsco Inc, is a textiles laundering plant in the Port Walthall industrial park and has two stormwater outfalls that discharge to Swift Creek near where it joins the Appomattox River. The May 24, 2012 unannounced pollution complaint response included only an exterior inspection with trash, chemical storage and general housekeeping issues observed. The June 21 inspection included interior and exterior inspections. Many of the chemicals used at this facility are highly toxic to aquatic life (including detergents, degreasers, acids and caustics). Large volumes in large containers (up to 330 gallons per container) of these chemicals are kept and moved on-site regularly. The business made significant improvements after the pollution complaint response. The most common concerns were employee education and housekeeping measures related to the disposal of liquids, trash, and debris. Secondary containment and spill preparation for chemicals was improved, and a lint filter was repaired. The second inspection did identify the need for physical repairs at both outfalls and additional actions required for some stains and materials found outside.

The Water Quality Section commercial/industrial inspector participated in thirteen Chesterfield County Industrial Waste Pretreatment Program inspections of large industries with permits to discharge industrial wastes to the county’s sanitary sewer system. Three “Category 5”, four “Category 4”, four “Category 3”, and two “Category 2” businesses were inspected. While the primary focus of these inspections was compliance with the industrial waste pretreatment permits, the exterior of each facility was inspected for stormwater compliance purposes and recommendations were made when appropriate. Best management practices, secondary containment, and spill response preparation for stormwater regulation compliance were common topics. One such inspection identified an active illicit discharge at a business leasing space from the inspected business, and another inspection found stormwater pipes inside the building due to conversion of a loading bay into industrial space.

In all of these inspections, copies of the *Business and Industry Guide to Chesterfield County's Illicit Discharge Ordinance* were distributed to the facility representatives. Copies of the aforementioned commercial and industrial inspection field sheets, memoranda and reports are on file at the Department of Environmental Engineering office and are available for review upon request.

Chesterfield County Environmental Management System Compliance Audits

Six external audits were conducted by an independent contractor in 2012 to evaluate compliance with state and federal environmental laws and regulations. The audits were completed to satisfy the county's Environmental Management System Evaluation of Compliance Procedure. Departments and offices audited included: Buildings & Grounds, Capital Projects Management, Environmental Engineering, General Services – Environmental Division, Parks & Recreation and Utilities – Falling Creek Wastewater Treatment Facility). Opportunities for Improvement were identified and are documented in individual departmental Corrective Action Requests (CARs).

(2) Describe a monitoring program for stormwater discharges associated with the industrial facilities identified in (d) (2) (iv) (C) of this, to be implemented during the term of the permit, including the submission of data on the following constituents: any pollutants limited in effluent guidelines; any pollutants listed in an existing NPDES Permit for a facility; oil and grease, COD; pH; BOD5; TSS, total phosphorous, TKN, nitrate plus nitrite nitrogen.

Releases from Industrial/Commercial Facilities

Thirty-eight releases to the county's stormwater system occurred during 2012 from industrial and commercial activities, as described in Table 11. Thirteen releases were from restaurants discharging washwater and/or waste cooking oil. Eight releases were from automotive repair or sales facilities, with most of those being vehicle washing discharges. Eight releases were from mobile services, a category that includes cement trucks, garbage trucks, fertilizer applicators, and mobile vehicle detailers. The remaining nine releases were comprised of diverse discharges – cleaning of asphalt trucks, trash from a hardware store, washwater from swimming pool cleaning, discharge of sediment at a tennis club when the sprinkler system malfunctioned, compost and garbage from a grocery store, cleaning of construction tools, an antifreeze spill in a parking lot, and improper cleaning or dumping at an industrial park.

Notices of Violation were issued in thirty of the thirty-eight incidents. NOV's were not issued in the following cases; the responsible party could not be identified (two incidents), the discharged amount was minimal and easily cleaned up or stopped (four incidents), the discharge was due to equipment malfunction and did not pose a threat to the environment (one incident), and the responsible party was actively cleaning up the release before Water Quality Section staff arrived on scene (one incident).

Table 11. Industrial/Commercial site discharges to stormwater system 2012.

<u>Date</u>	<u>Site Address</u>	<u>Industry/Facility</u>	<u>Discharge Category</u>	<u>Resolution</u>	<u>NOV Issued</u>
02/21/2012	3650 Courthouse Rd	Mobile Services	Washwater	Compliance	Yes - 1
02/22/2012	7011 Hull Street Rd	Automotive	Trash, Process Wastewater	Cleanup	Yes - 1
03/12/2012	11360 Iron Bridge Rd	Restaurant	Waste cooking oil, Washwater	Cleanup	Yes - 1
05/07/2012	13253 Rittenhouse Dr	Restaurant	Washwater	Compliance	Yes - 1
05/22/2012	10011 Hull Street Rd	Automotive	Washwater	Compliance	Yes - 1
05/23/2012	6701 Lake Harbour Dr	Restaurant	Process wastewater, Washwater	Cleanup	Yes - 2
05/25/2012	6641 Lake Harbour Dr	Automotive	Washwater	Compliance	No
05/29/2012	1268 Woodcroft Rd	Mobile Services	Cement wash-out	Cleanup	Yes - 2
06/01/2012	13728 Hull Street Rd	Restaurant	Waste cooking oil	Cleanup	Yes - 1
06/06/2012	11680 Lewis Rd	Asphalt plant	Washwater	Compliance, Referral to DEQ	Yes - 1
06/08/2012	6801 Lake Harbour Dr	Hardware Store	Trash	Cleanup	Yes - 2
06/12/2012	8300 Greenock Dr	Community Pool	Washwater	Compliance	Yes - 2
06/17/2012	3650 Brandermill Pkwy	Sports Facility	Sediment	Compliance	No
07/09/2012	13249 Rittenhouse Dr	Restaurant	Washwater	Compliance	Yes - 1
08/02/2012	14245 Midlothian Tp	Restaurant	Washwater	Compliance	Yes - 2
08/08/2012	6401 Centralia Road	Grocery Store	Waste cooking oil, Trash	Cleanup	Yes - 1
08/08/2012	8311 Midlothian Tp	Automotive	Washwater, Process Wastewater	Cleanup	No
08/13/2012	341 E Hundred Rd	Restaurant	Washwater	Cleanup	Yes - 1
08/27/2012	6401 Centralia Rd	Mobile Services	Dumpster contents	Cleanup	Yes - 1
08/30/2012	10456 Midlothian Tp	Restaurant	Washwater	Cleanup	Yes - 1
09/17/2012	2400 W Hundred Rd	Automotive	Washwater	Compliance	Yes - 1
09/21/2012	6521 Centralia Rd	Construction	Washwater	Compliance	Yes - 1
10/10/2012	12056 Southshore Pointe Dr	Restaurant	Washwater	Cleanup	Yes - 1
10/12/2012	13357 Rittenhouse Rd	Construction	Washwater	Compliance	Yes - 1
10/15/2012	12056 Southshore Pointe Dr	Mobile Services	Dumpster contents	Cleanup	Yes - 1
10/17/2012	8311 Midlothian Tp	Automotive	Washwater	Compliance	Yes - 1
10/17/2012	8028A Midlothian Tp	Automotive	Washwater	Compliance	Yes - 1
10/31/2012	3900 N Bailey Bridge Rd	Restaurant	Waste cooking oil	Cleanup	Yes - 1
11/02/2012	11649 Jefferson Davis Hwy	Automotive	Washwater	Compliance	No
11/09/2012	8201 Hull Street Rd	Shopping Center	Antifreeze	Cleanup, Responsible party not identified	No
11/10/2012	15600 WC Commons Way	Restaurant	Waste cooking oil, Washwater	Compliance	No
11/10/2012	13241 Rittenhouse Dr	Restaurant	Washwater	Compliance	Yes
11/11/2012	132 Schofield Dr	Mobile Services	Washwater	Compliance	Yes - 2
11/28/2012	6737 Lake Harbour Dr	Mobile Services	Dumpster contents	Responsible party not identified	No
11/29/2012	8849 Providence Ridge Ct	Mobile Services	Fertilizer	Cleanup	Yes-1
12/05/2012	2201 Seminole Ave	Mobile Services	Antifreeze	Cleanup	No
12/11/2012	10020 Chester Rd Suite C	Restaurant	Waste cooking oil, Washwater	Cleanup	Yes-1
12/17/2012	16412 Jefferson Davis Hwy	Industrial Park	Multiple unknowns	Cleanup	Yes-1

Updates to the Industrial/Commercial Facilities Inspection Program

The *Industrial & Commercial Facility Inspection Standard Operating Procedure Manual* was modified in response to comments made by the U.S. EPA during the audit process. This document is available upon request from the Chesterfield County Department of Environmental Engineering.

§122.26 (d)(2)(iv)(D)
“A PROGRAM TO IMPLEMENT AND MAINTAIN STRUCTURAL AND NON-STRUCTURAL BEST MANAGEMENT PRACTICES TO REDUCE POLLUTANTS IN STORM WATER RUNOFF FROM CONSTRUCTION SITES”

(1) Procedures for site planning which incorporate consideration of potential water quality impacts

Land Disturbance Permits

During the 2012 calendar year, the Environmental Engineering Department issued 92 land disturbance permits (483.85 total disturbed acres) to ensure compliance with the minimum standards and practices required in conjunction with the regulations pertaining to Virginia’s Erosion and Sediment Control Law. The description of these 92 land disturbance permits can be found in the monthly erosion and sediment control reports submitted to Virginia’s Department of Conservation and Recreation. Copies of these reports can be made available upon request.

(2) A description of requirements for nonstructural and structural best management practices.

Best Management Practices

Please refer to §122.26 (d) (2) (iv) (A), “*A Description of Structural and Source Control Measures to Reduce Pollutants from Runoff from Commercial and Residential Areas that are Discharged from the Municipal Storm Sewer System*” for details regarding BMP/SWM facilities in Chesterfield County (page 7 of this report).

(3) A description of procedures for identifying priorities for inspecting sites and enforcing control measures which consider the nature of the construction activity, topography, and the characteristics of the soils and receiving water quality.

Site Inspections - Erosion & Sediment Control

Environmental Inspections of the Department of Environmental Engineering is responsible for inspections and enforcement of the VADCR required Erosion and Sediment Control Program (ESC Program). In 2009, in an effort to improve compliance with VADCR ESC Program, the Department of Environmental Engineering began working in conjunction with the Department of Building Inspections. Building inspectors are now capable of conducting erosion and sediment control inspections concurrently with their inspections of single-family dwellings. In 2012, 25,077 erosion and sediment control inspections were conducted. There were 18,785 erosion and sediment control inspections conducted for single-family dwellings, 101 inspections for the acceptance of new secondary roads and 6,034 inspections for development sites and subdivisions. Resident complaints accounted for an additional 157 inspections in 2012. Eighty-two of the site and subdivision inspections resulted in the issuance of Notices to Comply. There were three Notices of Violations issued during the 2012 calendar year. Failure to comply with these notices resulted in five stop work orders issued. The Chesterfield County Department of

Environmental Engineering ESC program continues to be compliant with the Soil and Water Conservation Board in 2012.

(4) Educational and training measures for construction site operators.

Educational and Training Measures for Construction Site Operators

As previously reported, in conjunction with an amendment to the State Erosion & Sediment Control Law that was proposed by Chesterfield County, applicants for Land Disturbance Permits must designate a Responsible Land Disturber who has been trained in erosion and sediment control techniques and who is to oversee compliance with all approved erosion and sediment control measures on that site. As of this writing, several thousand contractors have now received certification through the state training and certification program. Additionally inspectors from the Chesterfield County Department of Building Inspections have been certified by the Department of Conservation and Recreation to assist in compliance inspections for single-family residential construction projects. The Environmental Engineering Department Web page contains education information regarding erosion and sediment control. The link for this site is: <http://www.chesterfield.gov/content2.aspx?id=2836>